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Why Does Hollywood Give Nerds a Bad Rap?

I just returned from a special theater screening of *War Games*—quite possibly the only good film Hollywood has ever produced about computers, computer nerds, or hacker culture. Shockingly, the movie, which was first released in 1983, holds up quite well, despite the use of archaic hardware (acoustic couplers and vocoder boxes), a laughable sentient military supercomputer, and an occasional lapse into typical Hollywood lingo.

The abundance of 8-inch floppy discs also gave people in the theater a laugh, as did the fact that characters were practically chain-smoking throughout the entire movie. Our biggest laugh came when the machine running the projector crashed—it displayed a Windows 2000 Start Menu, sending the nerd collective into hysterics—but none of the showing's pervasive air of yestertech could take away from the fact that *War Games* remains awesome. It was well-researched, authentic, and sometimes downright prescient. After all, the main premise of the movie is about people dialing into military networks using modems. Who would have thought that just five years after the movie's release, the military-focused ARPANET would be opened up to commercial interests, and very soon after that, the Internet as we know it would be born.

After the show, I lingered in the lobby with my fellow sweaty nerds and reminisced about good hacker movies. Well, we tried to, anyway. Aside from *The Matrix* (which was about a nerd but shares more DNA with Hong Kong martial arts flicks than anything else), there haven't been any good films that explore the geekiest depths of computing—ever. Think about it for a minute: *Hackers* was at best laughable, a blatant attempt to capitalize on a legitimate underground phenomenon. Even movies that first appear to add a promising element of nerdom always end up doing something dumb, like tarnishing a tense computer-based drama with idiotic and unusable (but oh so very sexy) 3D interfaces. Yes, I'm talking about the IRIX 3D filesystem featured in *Jurassic Park*.

Where *War Games* showed a likeable kid who hacked simply because he wanted a peek at new games, the other movies portray computer nerds as socially inept at best. At worst, they paint computer nerds as dysfunctional, "let the world burn" anarchist types. Over the last 10 years, I've met thousands of people who, like me, describe themselves as computer nerds, but I've yet to meet a single anarchist hacker. Maybe those guys are all holed up in their moms' basements, but my hunch is they're just another fictional stereotype, manufactured by Hollywood to explain anything it fears or doesn't understand.

I want to see some more good movies about people like me, computer nerds. Have I missed any forgotten classics? Is there anything I need to bump to the top of my Netflix queue? Let me know!

Will Smith

AHOY HOY!

Monitor Madness! page 42

Build a NAS Box page 72

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WRITE TO WILL Please send comments, questions, and Boo Berry cereal to willl@maximumpc.com. Include your full name, city of residence, and phone number with your correspondence. Unfortunately, Will is unable to respond personally to all queries.

THE NEWS

Intel's Centrino 2 Arrives

Company touts hybrid graphics, better battery life, and optional WiMax in its new mobile platform —GORDON MAH UNG

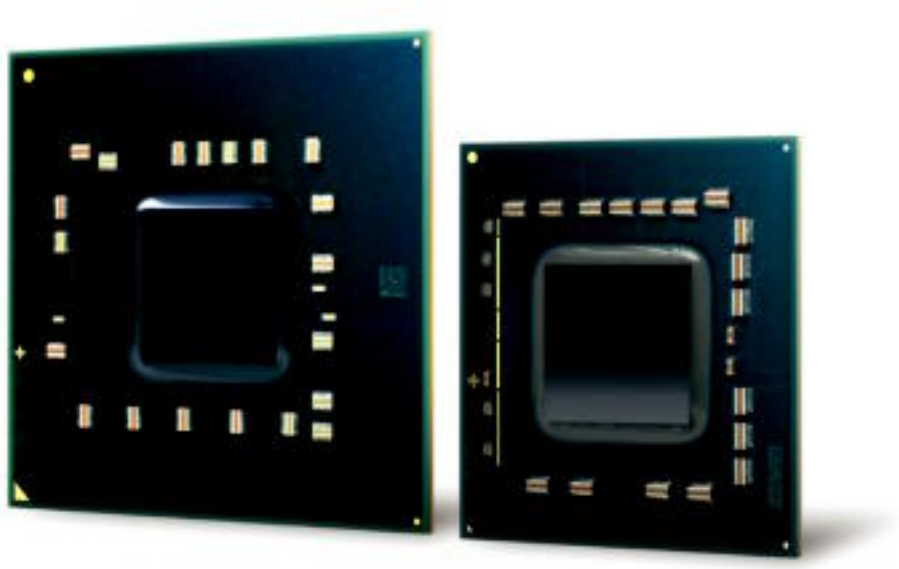
Intel usually garners a lot of attention for a product that's been renumbered. The new number implies significant changes, and often that's the case. It was that way when Pentium became Pentium II and Pentium III became Pentium 4. But does Centrino 2 truly deserve a new revision number—and all the hype?

That's the question some folks are asking as they kick the tires on Intel's new mobile platform, which is more evolutionary than revolutionary in nature. There's no die shrink for the CPU and no new instructions—and it doesn't exactly represent a quantum leap in performance.

That's not to say the Centrino 2 doesn't offer any changes. The new Centrino 2 lineup features five CPU models ranging from 2.26GHz to 2.8GHz. And though they're all based on the same 45nm Penryn-core chips the earlier Centrino offered, the front-side bus for Centrino 2 is stepped up from 800MHz to 1066MHz. A new Wi-Fi chip promises better range and power savings but no changes in standards—it supports the same 802.11a/b/g/n as the last-gen Centrino part. Intel also offers a WiMax component for Centrino 2, but it's not a required feature of Centrino 2-branded notebooks due to the lack of WiMax providers.

Perhaps Centrino 2's most significant offering is in the chipset. Intel is promising increased graphics performance with the new GMA 4500MHD graphics core, as well as the ability to support a hybrid mode that lets a consumer switch between power-saving onboard graphics and a discrete GPU. The new chipset also supports DDR2/800MHz speeds, up from 667MHz, and DDR3 up to 1066MHz data rates.

But beyond that, Centrino 2 hardly seems deserving of the deuce. Intel officials disagree and say that the new number is warranted. "There has been incremental performance and capabilities in the previous Centrino-based notebooks, but with Centrino 2, we were able to deliver new core features and better energy-efficient capabilities. This branding also helps consumers distinguish it as the latest generation," a spokesperson explained.



Intel is promising a boost in integrated graphics with the Centrino 2's new GM45 chipset.

Rob Enderle, principal analyst with the Enderle Group, says naysayers are being too cynical in thinking that the new revision is just a way to sell more units. At the end of the day, he says, it's just marketing, but he believes that Intel's intention with Centrino 2 is to get people focused on WiMax capabilities and the fact that integrated graphics may actually be decent for once.

Ian Lao, an analyst with In-Stat, agrees that most people won't see any significant changes in a feature-for-feature comparison between Centrino and Centrino 2, but he thinks there are enough changes for Intel to give a revision number. Among those significant differences is the power savings, which, according to Lao, is fairly significant with the new chips and chipset. Three of five new Core 2 Duos announced with Centrino 2 feature a 25-watt TDP—just slightly higher than the TDP of the original 1.7GHz Pentium M in the first Centrino.

A more compelling argument Intel has for the new number is the addition of the company's first quad-core mobile part. That's expected by the end of the year. Of course, many expect a truly new mobile CPU based on Nehalem by next summer.

THE CENTRINO 2 CPU LINEUP

Processor	Clock/FSB	Cache/TDP
Core 2 Duo T9600	2.80GHz/1066	6MB/35w
Core 2 Duo T9400	2.53GHz/1066	6MB/35w
Core 2 Duo T9500	2.53GHz/1066	6MB/25w
Core 2 Duo T8600	2.40GHz/1066	3MB/25w
Core 2 Duo T8400	2.26GHz/1066	3MB/25w

1.5 Terabyte Drives, Ahoy!

Seagate becomes industry leader in consumer storage capacity

Seagate began shipping the industry's first 1.5-terabyte hard drives this August. The 7,200rpm four-platter drives are part of the company's Barracuda 7200.11 storage line. Expect the other storage heavyweights to soon follow suit, just as vendors rushed to release products following Hitachi's terabyte announcement in early 2007. **–DM**

Flash Memory Makeover

New FE-NAND flash memory will live longer, cost less

Engineers at Japan's National Institute of Advanced Industrial Science and Technology have created a new form of flash memory that can sustain more than 100 million writes and erases, compared with the current industry standard of 10,000 writes and erases.

It's the result of a hybrid technology that uses a NAND flash memory schematic but replaces the NAND memory cells with ferroelectric gate field-effect transistors (FeFETs). FE-NAND flash memory cells aren't prone to the capacitance coupling noise that occurs between conventional cells using floating gates. This makes for longer life cycles, smaller size limitations, and higher densities than standard NAND—which will ultimately help reduce costs. **–DM**

E Ink Coming to Newsstands

It's no secret that magazines are facing all kinds of competition from digital media. To stay noticed, *Esquire* magazine is bringing digital technology to print. The publication will use E Ink—the technology found in Amazon's Kindle e-reader—on an upcoming cover, which will flash the message "The 21st Century Begins Now." A battery embedded in the front cover will power the E Ink for 90 days. A flashing ad for Ford's Flex SUV on the inside cover will fund the costly experiment. Kind of takes the air out of *Maximum PC*'s planned PC hardware scratch-'n'-sniff campaign. **–KS**

Call it Netflox 360

Microsoft isn't letting its Live Marketplace aspirations inhibit its pursuit of console dominance. The company has teamed up with competing movie and TV-show rental service Netflix to make the Xbox 360 more attractive to consumers. Beginning this fall, you can use a 360 to access Netflix's streamed content from a TV set, provided you're a Netflix subscriber. Can't do that with a PS3. **–KS**

AMD: Too Needed to Fail

AMD continues to suffer through corporate misery, most recently by losing almost $1.2 billion in a single quarter, forcing the replacement of CEO Hector Ruiz with his subordinate, Dirk Meyer. If AMD collapses and Intel becomes the only major vendor of PC processors, will prices soar?

Unfortunately, monopolies usually do inflate prices. They also retard progress. AMD stimulates Intel to price its processors more aggressively and develop better processors. Without AMD, we might not have 64-bit x86 processors today or PC processors with integrated memory controllers. Right now, we'd probably be looking forward to the first quad-core x86 processors instead of the first eight-core chips.

Behind AMD, there isn't much competition. In third place is VIA Technologies, a Taiwanese company with a small x86 design team in Texas. VIA doesn't challenge Intel's high-performance PC and server processors, as AMD does. Instead, VIA sells low-power x86 chips. But even at the bottom of the barrel, VIA scrapes for a measly 2 percent market share, and Intel's new Atom is surprisingly stiff competition.

Too bad AMD isn't a big Wall Street bank. Then the Federal Reserve could bail it out.

Actually, a government rescue would make more sense for AMD than it does for most banks. There are thousands of banks, but only two large companies making PC processors. Overnight, AMD's demise would create a monopoly that's almost impossible for another company to break.

Oddly, monopoly status could harm Intel's business plans. Contrary to popular belief, U.S. law doesn't forbid monopolies—it merely forbids companies from using monopoly power to dominate other markets. If Intel gains a monopoly in PC processors, any move toward dominance in other processor markets might be challenged in court. Intel has enough legal problems already with lawsuits alleging anticompetitive practices. Monopoly status could prevent Intel from diversifying in important ways.

Therefore, even Intel has reasons to keep AMD alive. PC users do, too. AMD isn't "too big to fail," but it might be too needed to fail.

Tom Halfhill was formerly a senior editor for *Byte* magazine and is now an analyst for *Microprocessor Report*.

Find Parking Online

Streetline wants to make parking hassle-free

Finding a parking space is set to get a bit easier in San Francisco if a pilot project achieves its expected results. The city, working with tech firm Streetline, is installing a network of sensors that will alert drivers to the availability of parking spaces.

The $95 million project will cover 25 percent of the parking spaces in San Francisco and is expected to relieve traffic congestion by freeing drivers from having to repeatedly circle an area in search of an open space. Updates on space availability will be transmitted to street signs and smartphones—the latter via a map interface that will show the percentage of open spaces in a certain area. Additionally, when the plan is fully implemented, users will also be able to pay for parking via their smartphones. –TE

Streetline will allow users to see the availability of parking spaces in real time.

Attorney Sues Google over Ads

When an online advertising campaign goes sour, who's to blame? A Boston, Massachusetts-based attorney believes Google is responsible for wasting his paid-for advertising platform on parked domain names and web-error pages.

Hal K. Levitte filed a class-action suit against Google in mid-July, alleging that the search giant is at fault for forcing him to spend 15.3 percent of his near-$900 advertising campaign on web pages that didn't give him a scrap of business in return. He maintains that Google does not give its clients a way to opt out of the AdWords programs that incorporate these "low quality" websites.

If Google is found liable, the damages could be a hefty kick to the company's advertising cash cow, which pulled in $8.6 billion of revenue in 2007. –DM

Chrysler Rolls with Wi-Fi

Company's 2009 vehicles will offer wireless Internet as an option

Chrysler's UConnect Web service will likely involve a subscription in addition to the router installation fee. It combines both Wi-Fi and 3G cellular connectivity and is active only when the key is in the car's ignition, to thwart Wi-Fi freeloaders. –KS

GAME THEORY

Absolutely Scrabulous!

There's a game that's become part of my daily regime. It's one of the first things I do after firing up the laptop over my morning coffee and the last thing I do before shutting down the laptop with an evening gin. It never takes more than a few minutes, and I do it throughout the day, like answering email. In fact, it *is* answering email, except with little lettered tiles.

Yes, I am completely addicted to Scrabulous (www.scrabulous.com). Email games are certainly nothing new, but good, well-supported, free email games that a wide variety of people can play without any initial purchase are pretty rare.

Everyone, even your mom, knows how to play Scrabble. And Scrabulous is a brilliant, fast, free, easy-to-use, and feature-rich conversion of the game with both live and email play. (Just keep track of who you're playing against if you juggle multiple games at once. You don't want to throw down "ZYMURGY" with a hearty IM cry of "BITE ME!" and then suddenly remember your mom, and not your college roommate, is on the other end.)

This is a game by fans, for fans, which is why it's the most popular game on Facebook. And that's *really* pissing off Hasbro and Mattel, the companies that acquired various rights to the game after a tangled history of deals and bankruptcies. (You didn't think they actually *invented* it, did you?)

You see, Scrabulous has almost a million registered users and a large number of them access the game through Facebook. When Mattel launched its own Facebook version of Scrabble it attracted about 2,000 players. Such a thing cannot stand. Summon the lawyers!

Thus far, Facebook has refused an order to remove Scrabulous, but just how long are Hasbro and Mattel going to squat on classic game designs and snarl like a dog guarding a pile of juicy bones? I would bet that everyone playing Scrabulous already owns a Scrabble board. Scrabulous just helps users connect their boards electronically, and that in turn will... sell more Scrabble boards. It's a bold new world, if the game giants can just figure it out.

Thomas L. McDonald has been covering games for 17 years. He is an editor at large for *Games* magazine.

Nvidia's Latest Legal Woes

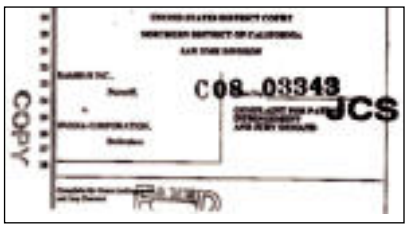
Rambus sets lawyers loose on Nvidia; memo introduced as evidence

Bad news comes in waves. For Nvidia, it comes with lawyers too. In July, Nvidia found itself the target of a lawsuit by Rambus and stands accused of stealing the company's intellectual property.

Rambus filed the suit after years-long talks with Nvidia broke down, a spokeswoman for Rambus said. The suit alleges that Nvidia is violating Rambus's IP in the memory controllers used in Nvidia chipsets and graphics cards. Rambus has long claimed to hold the majority of the memory-data-rate-doubling schemes and threatened to sue Nvidia, ATI, and other chipset vendors years ago.

So why is Nvidia now the sole target? Rambus has licensing deals with Intel and AMD—and thus, by extension, also ATI. Nvidia officials said they could not comment on pending litigation, but the company has filed a countercomplaint accusing Rambus of being anti-competitive by adding information it gleaned while on the memory standards board to its IP.

The same month, a judge overseeing a class-action suit that accuses Nvidia and ATI of collaborating to fix prices appeared to deal both companies a setback. At the center is a letter from an Nvidia executive to an ATI executive that states: "I really think we should work harder together on the marketing front. As you and I have talked about, even though we are competitors, we have the common goal of making our category a well positioned, respected playing field. $5 and $8 stocks are a result of no respect." U.S. District Judge William Alsup of the Northern District Court said a jury would like to see the document.



Judge Wapner may be camped outside of Nvidia's offices.

The class-action suit is a combination of 51 separate civil suits against Nvidia and ATI that argue damage from price fixing. The Department of Justice is also looking into potential price fixing by the companies. The legal downpour follows news from Nvidia that it is taking a $150 million to $200 million write-down for graphics chips that are failing in notebook PCs. Nvidia said the problem is related to a packaging issue by suppliers it uses. –GU

CITY'S NETWORK HELD HOSTAGE

IT admin withholds access codes, mayor intervenes

Terry Childs, a network administrator with San Francisco's Department of Technology, was arrested last month on four charges of tampering with a computer network and one charge of causing losses in excess of $200,000 and has been accused of locking all other employees out of the city's FiberWAN network. Childs's attorney has stated that the entire episode is a misunderstanding and Childs was acting to protect the network from other employees, including one who inadvertently introduced a virus to the system.

After initially providing the city with fake access codes, Childs gave San Francisco mayor Gavin Newsom the correct login information after a jailhouse visit. Meanwhile, evidence has surfaced casting doubt on Childs's argument that he was trying to protect the system. According to Ron Vinson, chief administrative officer of the city's Department of Telecommunications and Information Services, "There is proof that the core devices were designed to fail during any power outage or password reset. Had our team not stopped the impending service outages, one-third of our FiberWAN would have crashed." –TE

BYTE RIGHTS

Copyrighting Wrongs

With a presidential election around the corner, let's look at how people pervert copyright law to squelch speech. Copyright takedown notices were never meant to stifle whistle-blowers or detractors, yet that's become a popular use for them. Individual critics are likely to go broke even if they win a case, so people and ISPs tend to back down at lawyer point.

One of the most repugnant misuses of the takedown notice was by Diebold, a maker of electronic voting machines. Diebold responded to allegations of security flaws with an "Oh no, our machines are fine! Move along!" type of response. But leaked internal Diebold documentation posted on the net confirmed the company knew it was p0wned. Diebold couldn't deny anything—instead it demanded the documentation be taken offline, on the basis of copyright infringement. According to the EFF, Diebold failed to pass "the giggle test" on that case.

Nobody loves its copyrights and hates its former members like the Church of Scientology. It makes the RIAA look like an amateur when it comes to suing the hell out of its critics, anywhere, anytime. The Church of Scientology has been at it the longest, too. When there's no legitimate way to gag your critics, you're down to sending a cease-and-desist letter or hiring a team of ninjas to take them out. The former is a lot cheaper. Even if the latter is more fun.

It goes on... the Jehovah's Witnesses shutting down a critical website, the rapper Akon trying to shut up conservative pundit Michelle Malkin, etc.

My personal favorite is radio personality Michael Savage. Savage made some comments about Islam on his radio show that were, shall we say, colorful. The nonprofit Council on American-Islamic Relations (CAIR) posted these comments on its site to highlight his bigotry. So Savage sued for copyright infringement. At no point did he actually try to defend his comments, he just tried to hit CAIR over the head with a big lawyer and intimidate the group into silence. In this case, the EFF stepped in and hit him back.

But it's such a weak way to shut people up. If you really want to oppress someone, I say get the ninjas.

Quinn Norton writes about copyright for Wired News and other publications. Her work has ranged from legal journalism to the inner life of pirate organizations.

THE LIST

The 9 Best PC Games of E3

9 RED ALERT 3

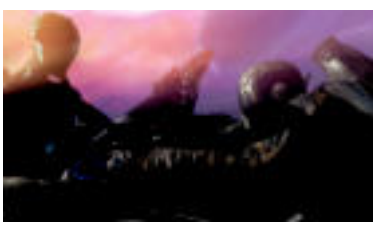
Three words: telekinetic Japanese schoolgirl.

8 PRINCE OF PERSIA

Poised to retake the action-adventure crown.

7 DC ONLINE

We'll be Batman's lackey any day.



DARK VOID

6

The brutal action of Gears of War combined with the adventurous spirit of *The Rocketeer*.

5 FAR CRY 2

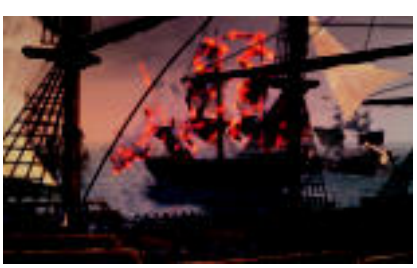
Marvel at the majestic beauty of the African savanna—then burn it to the ground.

4 MIRROR'S EDGE

We wouldn't dare attempt these death-defying leaps in real life. But when our in-game avatar executes fluid parkour, it's awesome.

3 EMPIRE: TOTAL WAR

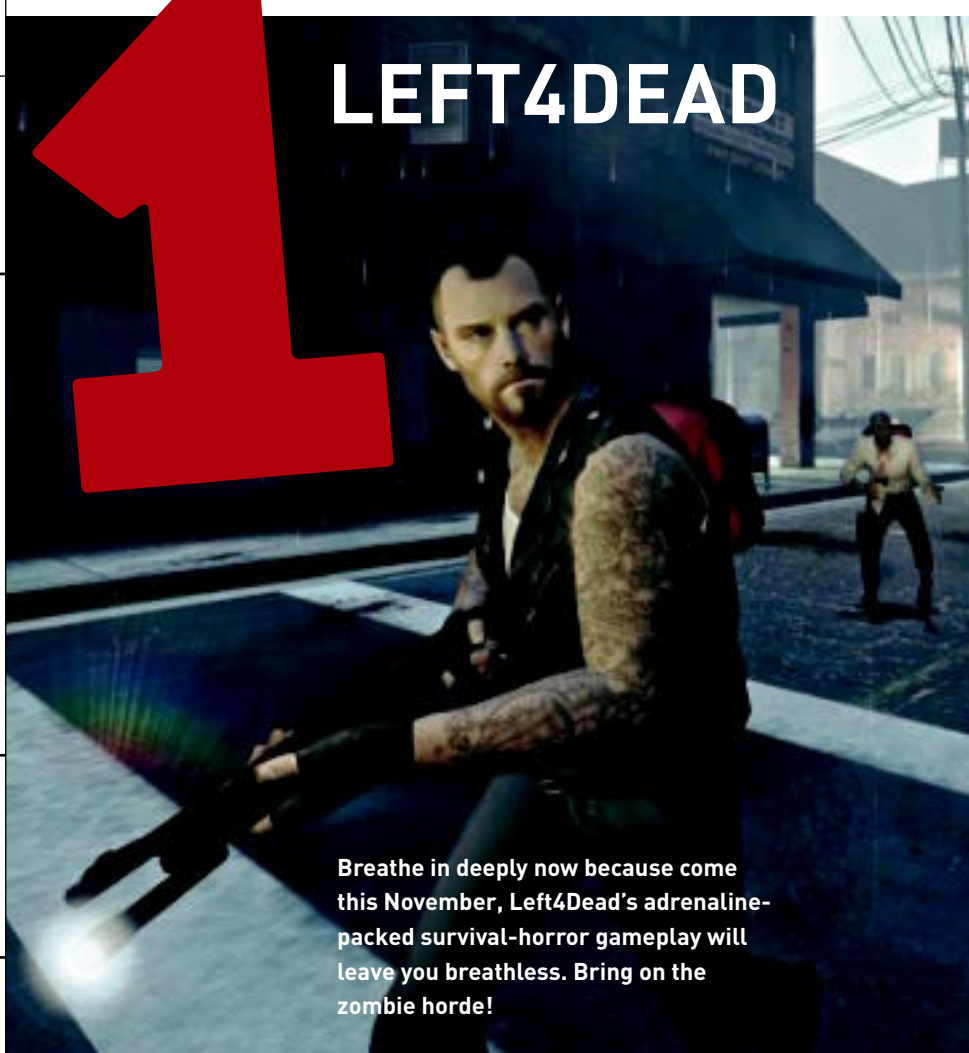
We weren't sold on naval warfare until we saw a fleet of battleships blown to splinters and individually rendered crew members duel with boarding parties.



2 FALLOUT 3

The richly detailed ruins of a postapocalyptic Washington D.C. are eerie and haunting, while the complex story promises to be similarly dark.

1 LEFT4DEAD

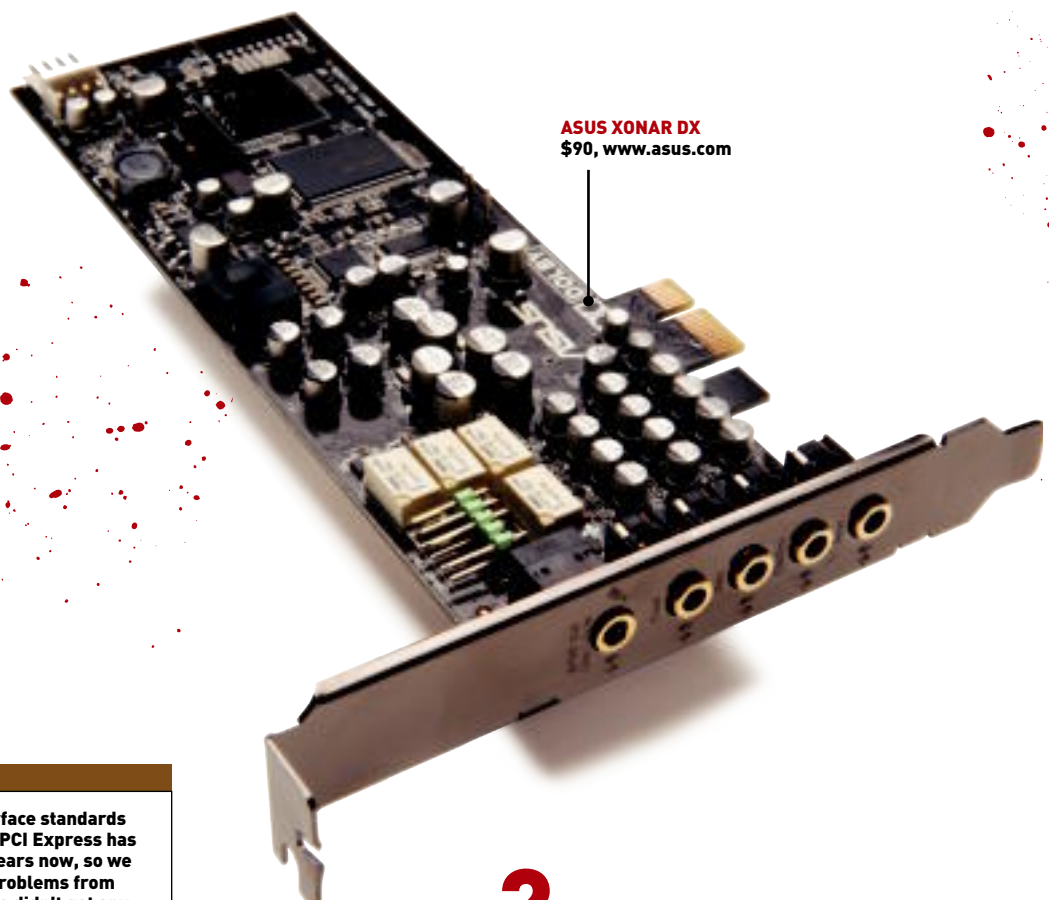


Breathe in deeply now because come this November, Left4Dead's adrenaline-packed survival-horror gameplay will leave you breathless. Bring on the zombie horde!

DEATHMATCH

Creative SB X-Fi Titanium vs. Asus Xonar DX

PCI Express has graced motherboards since 2004, but few applications beyond graphics have really taken advantage of the I/O interface—until now, with soundcards finally getting into the game. Besides offering bandwidth far beyond that of the PCI bus, PCI-E also has the potential to eliminate the bus-throttling issues that have plagued PCI-based soundcards since the days of the Voodoo2. We decided to throw two advanced PCI-E soundcards, Creative's new Sound Blaster X-Fi Titanium Fatal1ty and Asus's budget-minded Xonar DX, into a cage fight to determine which audio solution is superior. —GORDON MAH UNG



ASUS XONAR DX
$90, www.asus.com

ROUND 1

COMPATIBILITY

Adopting new interface standards can be painful, but PCI Express has been out for four years now, so we didn't expect any problems from these cards. And we didn't get any from the X-Fi Titanium, but the Xonar DX simply would not install on our EVGA nForce 680i SLI board without rolling back the BIOS two revisions. Asus said the issue seems to be especially bad with reference-design nForce 680i boards, but newer-generation nForce boards also seem to gag on Xonars.
WINNER: X-FI TITANIUM FATAL1TY

ROUND 2

PRICE

Price isn't everything, but these days, an extra $50 in your pocket translates into another 10.8 gallons in your tank. So despite the X-Fi Titanium Fatal1ty being one of the cheapest Fatal1ty cards (at launch), the Xonar's $90 solution is an even better deal.
WINNER: XONAR DX

ROUND 3

FEATURES

The two cards are pretty evenly matched in features. Both are x1 PCI-E cards, both do Dolby Digital Live, and both have standard front-panel headers. Additionally, each offers excellent-sounding, high-quality codecs (though the Xonar DX specs, on paper at least, are superior). The X-Fi has the advantage of offering both optical SPDIF-in and -out ports, while the Xonar DX combines the mic/line-in port with an optical SPDIF-out port. The X-Fi also offers EAX5 support—a feature the Xonar DX emulates at questionable quality.

WINNER: X-FI TITANIUM FATAL1TY

CREATIVE SOUND BLASTER X-FI TITANIUM FATAL1TY
$140, www.soundblaster.com

ROUND 4

PERFORMANCE

With soundcards, performance refers to frame rates in games. The theory is that if the CPU has to work harder to figure out all the math for the audio algorithms, you get lower frame rates. In our tests, the Xonar D2 was just slightly slower than the X-Fi Titanium Fatal1ty, which backs up what we've seen over the years: An onboard DSP, such as the one in the X-Fi, used to be far superior to the host-based audio of the Xonar D2, but it doesn't seem to make the difference it did when CPUs were much slower. The real shocker was that we found an older PCI-based X-Fi to be faster than both cards by a bit. We're not talking about huge differences, but for folks who thought moving the soundcard to the über-fat PCI-E interface would pay performance dividends, it doesn't. At least not today.

WINNER: TIE

ROUND 5

AUDIO QUALITY

Audio quality, like visual quality, can be subjective. For this deathmatch, we listened to various 24-bit/96KHz audio samples using high-quality in-ear buds and also sampled various modern games for 3D positioning. The Sound Blaster X-Fi Titanium Fatal1ty had the edge, despite the Xonar DX's better paper specs. In games, the Xonar DX sounded less brilliant than the X-Fi and on occasion crackled when the card's GX gaming mode was enabled.

WINNER: X-FI TITANIUM FATAL1TY

And the Winner Is...

The X-Fi Titanium Fatal1ty is the winner of this fight. The fact that it works in nForce boards out of the box—hell, we even had luck running it on a Vista 64-bit configuration with 8GB of RAM and SLI!—makes us think that Creative is finally getting serious about the driver complaints it has been receiving. We also think it's worth paying for true EAX 5.0 support over the Xonar DX's faux EAX support. That doesn't mean the Xonar DX was beaten completely senseless. It's a good-sounding card and it's more affordable than the X-Fi Titanium Fatal1ty. It's also the only low-profile PCI-E soundcard we know of. That makes it a good choice for home-theater PC builders looking to improve on onboard audio. Of course, the real question is whether it even makes sense to use PCI-E. We did see slight performance degradation over standard PCI with both cards, but we suspect that's due to immature drivers. One thing you do get with PCI-E is the ability to finally fill those appendix-like x1 PCI-E slots that many motherboards have above the graphics slot.

Our consumer advocate investigates...

SumoSac Slowdown

Trojan Mouse

Cheating at Battlefield

Blame It on Canada

Dog, two months ago I ordered a SumoSac from Sumolounge.com. It's basically a giant foam-filled beanbag chair covered in microsuede. The order process went fine, but after waiting two weeks, I still had not received any notification that my order shipped. I emailed and called twice. I was assured my order would be fulfilled soon. It has been more than a month and still nothing. To make matters worse, now when I try to email or phone, there is no response. The only saving grace is that my credit card has not been billed yet. I'm willing to wait a bit longer if the company is truly that backed up, but I don't want to wait forever, and now I can't even get in touch with anyone.

—Logan Holmberg

The Dog spoke with Andrew Milligan, owner of Sumo Lounge, about Logan's order. Milligan said the company had experienced problems getting its Canadian brokerage account up and running. He also explained that the SumoSac has been a hot seller and demand has been overwhelming.

Milligan said a fix for the Canadian problem was in place and he would issue a $50 credit to Logan for the delay and offer compensation to other customers in Canada who had to wait more than 7 to 10 days for their orders. Milligan also posted a message addressing the problem on the company's website: "All together, we dropped the ball with our customer service and have just recently finalized a long-term solution to ship to Canada."

The Dog spoke with Logan, who said he was satisfied with Sumo Lounge's response. The Dog himself was pleased with Sumo Lounge's prompt actions. In a time when most companies find it easier to ignore customers rather than provide great service, Sumo Lounge is doing the right thing and should be applauded for it.

Sumo Lounge is compensating Canadians who had to wait more than 10 days to receive their sacs.

A Trojan Mouse?

I'll admit I don't know a whole lot about Trojans. But I was installing the drivers for my Logitech wireless mouse and keyboard combo along with the desktop advisor when Kaspersky Antivirus told me there was a Trojan in my F: drive. That's my CD drive. I halted the installation and did a virus scan, which came up clean. I explored the disk and Kaspersky identified a file on it as the Trojan. Could a reputable company like Logitech be infecting its customers?

— Joshua Parnell

Josh, you've run into a false positive. Kaspersky is identifying LDMClient.exe as a generic Trojan because of what the executable does. LDMClient.exe downloads updates and news flashes from Logitech, which Kaspersky is identifying as Trojan-like routines. But just to make sure Logitech didn't somehow distribute a Trojan on its install CD, the Dog contacted the company; a spokesperson explained that the Logitech Desktop Manager is safe and that, no, it had not unwittingly distributed a virus with its keyboard and mouse combos.

Judge, Jury, and Resetter

My son and I have been fans of the Battlefield game franchise since Battlefield 1942 and have purchased every game and expansion pack for the series. I've heard many horror stories of players getting their stats erased by cheating or stat padding but never thought it would happen to us, as we play by the rules. Recently, I received an email from EA saying my son's account stats were reset due to exploitation of the game/service mechanics/scoring system. There is a mechanism for disputing the accusations, but the result was less than satisfactory.

EA told us: "Thank you for contacting the Battlefield 2142 EA Support Team. After reviewing your account it has been found that you have abused the scoring system in order to achieve an unfair advantage. Unfortunately, evidence was found that matched or exceeded our current criteria for this type of abuse. Rest assured that your account, its stats, and the abuse were fully reviewed and the evidence verified before taking any action.

This action was taken for the benefit of the Battlefield online community and its members. I'm afraid that there is no further appeal process in this matter, and we hope that moving forward you will not attempt to abuse the Battlefield 2142 scoring system again, as it may result in the termination of your online access.

As well, please remember that you will not exploit any bug or system in the Service or in any EA product to gain unfair advantage and you will not communicate the existence of any such bug (either directly or through the public posting) to any other user of the Service. We want to thank you for your cooperation in this matter and hope that you continue to support fair and safe gameplay."

Dog, I believe my son when he says that he did not cheat his stats because we usually play on the same servers together. I think the stats system is flawed, and until now, I just put up with it. When they delete the stats for a player who has logged hundreds of hours of game time, this should not be ignored. They should at least be required to show proof that something was abused.

—Keith Soreghen

The Dog contacted Electronic Arts for an explanation regarding its policy on stats wipes and a player's recourse in such an event. The company said: "We receive many questions like this from customers who have had their stats reset for scoring abuse or other terms of service violations. In each case when someone is reported by a customer, or submitted for review by an EA Employee or Ranked Server Provider, we fully review the account in question. We scrutinize the stats and compare them to a set of numbers that EA Support (and development) has determined are outside of normal general gameplay.

These stats can include (but are not limited to) knife death/kill ratios, pistol death/kill ratios, best kill streaks, best rounds, and support related ratios. These policies and stats are periodically reviewed to make sure our comparison data is relative to current play style and game mechanics. In the event a customer contacts us about their stat reset, EA Support reviews each appeal, making sure the original employee who wiped the stats followed policy and that the stats wipe is valid. In the event an error is made, those stats are restored and the customer responded to. In the event that the stat review points to a valid wipe then the customer is told this as well.

Unfortunately, in almost all cases we cannot disclose the evidence we gather to a customer, as this could lead to that information 'leaking' to the public and then our review process would be compromised and cheaters would then just cheat to 'right below' the line we use. In all cases, the gains the customer attained were done outside of normal gameplay and for the sole benefit of themselves. This type of behavior, if unchecked, can ruin an online community quickly, and in light of that, the franchise it belongs to. Only through fair, consistent, constant, and honest review can abuse like this be checked and removed from the game for the benefit of the community."

The upshot, Keith, is that you have no recourse. The company has "proof" that you cheated, but it can't share it with you. Call the Dog a card-carrying member of the American Gaming Liberties Union, but this just doesn't sit right, even though the Dog thinks cheaters should be garroted with a PS/2 keyboard cord. But let's be fair to EA: It's not the only company to eject and nuke stats based on cheating allegations. Almost every online game company is known to punish players without presenting any actual proof of cheating to the accused.

Some folks will assume you're blinded by loyalty to your son and that he was indeed cheating—otherwise, why would EA erase his stats? Still others will blame EA for acting like secret police, making people or their stats disappear in the middle of the night. All sides would be aided by greater transparency from game companies. Introducing justice to online gaming, however, would not be easy. Would the companies impanel a jury of gaming peers and present it with stats and videos of the person cheating? There's simply no clear-cut answer. For now, your son has been judged guilty and there's no way to prove his innocence.

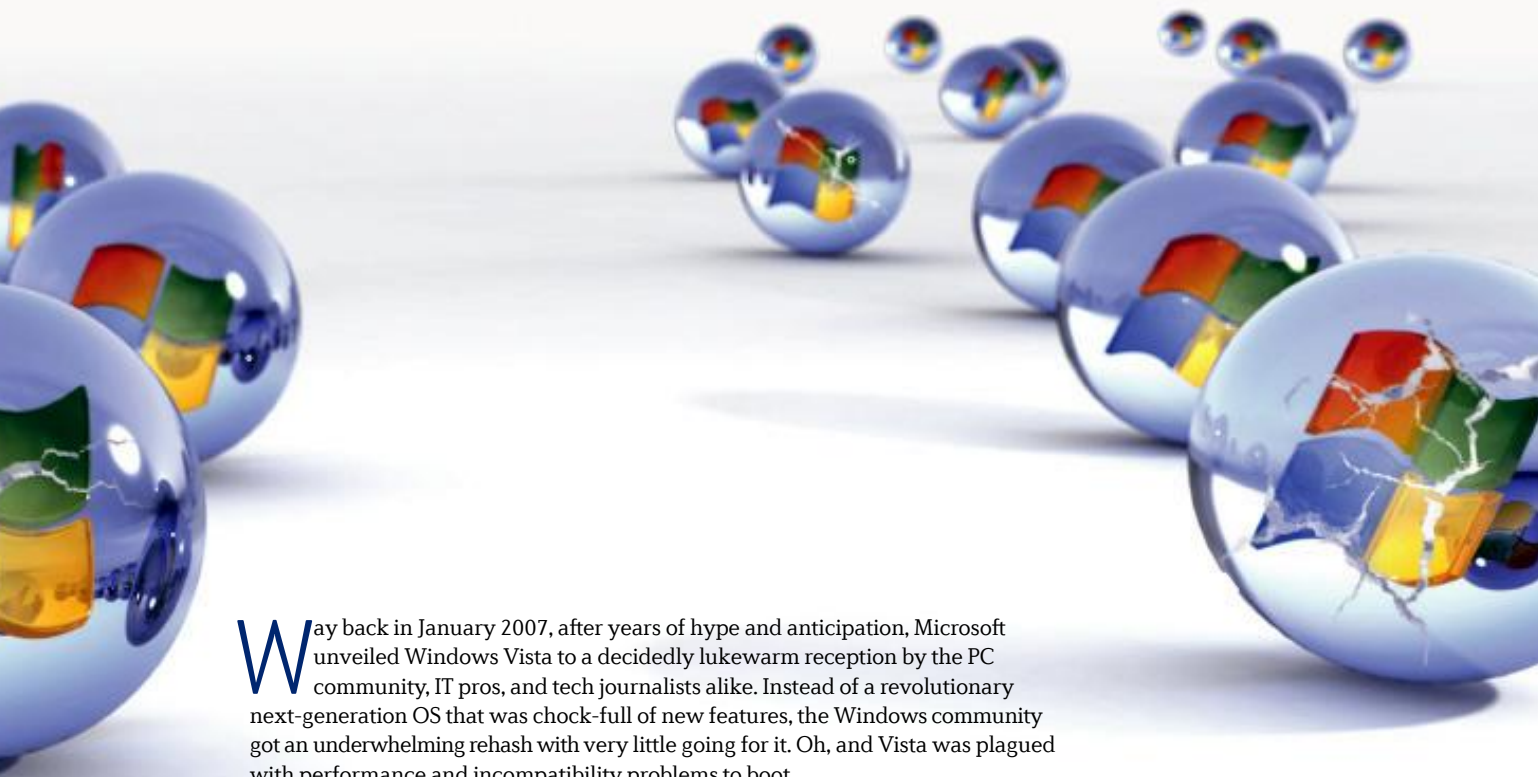
THE COMPANY HAS 'PROOF' THAT YOU CHEATED, BUT IT CAN'T SHARE IT WITH YOU.

EMAIL THE WATCHDOG If you feel you've gotten a raw deal and need assistance setting a vendor straight, email the Dog at watchdog@maximumpc.com. Please include a detailed explanation of your problem as well as any correspondence you have sent concerning the issue.

Shattered Dreams & Broken Promises

We sat down with Microsoft to hear the company's side of the Vista story. What lessons have been learned following the worst Windows launch in the company's history? Is Microsoft doing enough to regain PC users' faith?

BY WILL SMITH



Way back in January 2007, after years of hype and anticipation, Microsoft unveiled Windows Vista to a decidedly lukewarm reception by the PC community, IT pros, and tech journalists alike. Instead of a revolutionary next-generation OS that was chock-full of new features, the Windows community got an underwhelming rehash with very little going for it. Oh, and Vista was plagued with performance and incompatibility problems to boot.

Since then, the PC community has taken the idea that Vista is underwhelming and turned it into a mantra. We've all heard about Vista's poor network transfer speeds, low frame rates in games, and driver issues—shoot, we've experienced the problems ourselves. But over the last 18 months, Vista has undergone myriad changes, including the release of Service Pack 1, making the OS worth a second look. It's time we determine once and for all whether we should stick with XP for the next 18 months while we wait for Windows 7. But before we answer that question, let's review exactly what's wrong with Windows Vista.

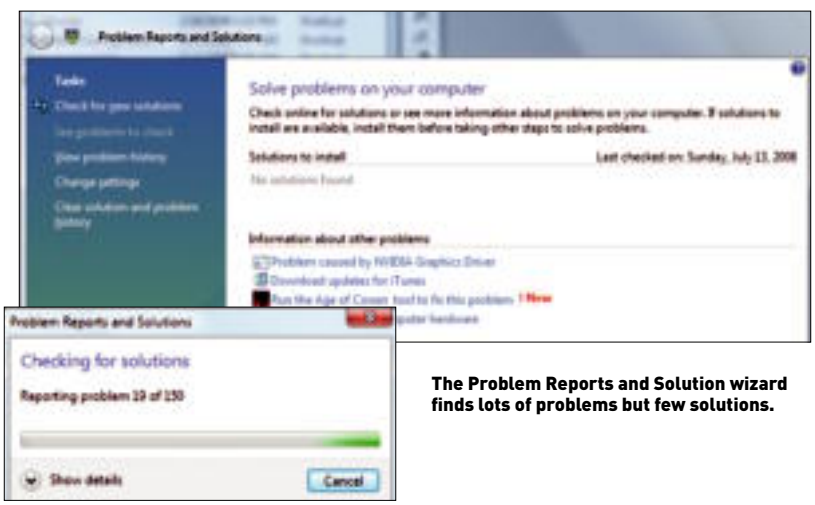
What Went Wrong with Vista's Launch?

We've seen worse launches over the years, but not from a multibillion dollar product that was a half-decade in the making. Here are the seven biggest contributors to Vista's dud of a debut

INSTABILITY

At launch, we complained that Vista was significantly less stable than its predecessor. We experienced more hard locks, crashes, and blue screens in the first weeks of use than we had in the entire year prior using XP. Sadly for Microsoft, our experience was shared by many early Vista users.

The problems weren't limited to high-end, bleeding-edge hardware, either. People with pedestrian, nonexotic hardware configs reported crashes, instability, and general wonkiness with Vista on laptops and desktops, in homebuilt rigs and OEM machines, and in PCs that originally shipped with XP. Considering that improved stability was one of the biggest promises Microsoft made for Vista, users were understandably upset.



The Problem Reports and Solution wizard finds lots of problems but few solutions.

INCOMPATIBILITY

Microsoft didn't make any big promises about application compatibility, and it's a damn good thing. If a desktop application didn't follow Vista's rules for behavior, Vista wouldn't let it run. The program would fail to load, crash on use, or eat the user's data, depending on the development infraction. And to be clear, we're not talking about shareware apps created by some dude in his basement, we're talking about Acrobat Reader, iTunes, Trillian, and dozens of other programs, not even counting the antivirus programs that are rarely compatible with a new OS.

Getting hardware working could be just as challenging. If you had one of the millions of perfectly serviceable, but suddenly incompatible printers or scanners, you probably felt pretty raw. We know we did.

Additionally, if you needed to connect to a VPN (virtual private network) that isn't supported by Vista's built-in client, you were probably out of luck. Vista shipped without support from major VPN manufacturers, including Cisco, leaving work-at-home types out in the cold.

The massive number of compatibility problems ensured that every user would be touched by at least one disappointment.

PERFORMANCE

We would expect a new version of Windows to be slower than the previous one, given immature drivers and new features that drain CPU cycles and absorb memory. However, the performance differential has always been less than 10 percent in the past and only really evident in hardware-intensive apps, such as games.

At Vista's launch, our tests revealed worse-than-expected performance in many different tasks and applications. Gaming performance suffered notably; using drivers from the launch time frame, our tests showed as much as a 20 percent performance difference between Vista and XP on the same machine. But that wasn't the worst of it.

Even common tasks suffered. Large network file transfers took a ludicrous amount of time, even on systems hardwired to gigabit networks. On affected machines, Vista could take days to transfer a full gigabyte of data! While that was a worst-case scenario, many users complained that file transfers took twice as long to complete in Vista as in XP.

USER ACCOUNT CONTROL

Vista brought marked improvements to the overall security of Windows, one of the few areas in which the OS actually lived up to Microsoft's promises. Unfortunately, one of the mechanisms that helps enable that security comes at a high cost—it's incredibly annoying.

That's right, we're talking about User Account Control, aka UAC. Even if you don't know what it's called, if you've used Vista, you're undoubtedly aware that you need to prepare your clicking finger when the desktop darkens and your trusty PC starts asking whether you *really* meant to install that application you just double-clicked. UAC prompts you whenever an app tries to write to an area of your hard disk or registry that Windows finds suspicious. This seems like a good thing, right? It would be, except UAC prompts every time the installer does something suspicious. We've had Vista prompt us no fewer than five times before completing installs it questioned.

The problem is compounded by

the fact that those five prompts look and behave differently, even though they're all asking for basically the same thing: permission to write to a protected area of your system. To make matters even worse, none of the UAC prompts actually tells power users what the app is doing. When you click that Allow button, all you're doing is adding a speed bump to whatever malware you might be installing.

Executed properly, UAC could have been a savior for people wont to install every application they find. Unfortunately, the UAC prompts quickly become so annoying that most users either disable them (the power-user option) or mindlessly click Allow (the mom option).

ACTIVATION

Activation has been a hassle since Microsoft first included it with Windows XP. Microsoft's never really honored its stated 90-day limit for discarding activation information either. After installing the OS once or twice, you inevitably have to call some poor sap manning the activation hotline to enable Windows. What bothers us about Vista is the inclusion of the Windows Genuine Advantage software, which periodically checks in with Microsoft to ensure that the copy of Windows you've already activated remains genuine.

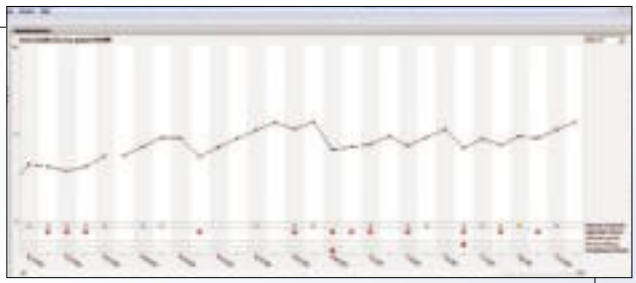
That's all well and good, unless something confuses WGA. Unfortunately, just about everything confuses WGA. It could be something as simple as a BIOS reset that sets the clock back a few years. Or it could be that Microsoft's entire activation process shuts down for a few hours—like it did last August. But at least Microsoft curbs piracy of Vista and other activated software by treating its customers like criminals, right? Well, not so much. Hacked versions of Vista that simply bypass activation are available on BitTorrent sites around the world.

VERSION OVERLOAD

In the old days, there were two distinct versions of Windows: one for home users and one for corporate users. For home, you bought Windows 98; IT departments bought Windows NT (at least the serious ones did). With Windows XP, this trend continued, despite the fact that both the home and enterprise OSes used the same core.

With Vista, the old home and enterprise distinctions went out the window, as Microsoft added three more versions of Windows, removing crucial features like the 3D UI from the low-end release and forcing power users who want access to both work-friendly and enthusiast features to shell out for the $400 Ultimate edition. To help justify that exorbitant price, Microsoft promised Ultimate Extras, the first of which didn't materialize until months after launch, and those that did appear were disappointing. A bad Texas Hold 'Em game, a backup utility that should have been included in every box, and support for other languages do not "ultimate extras" make.

Oh, and if you used Windows XP Professional at home and wanted to upgrade to a less-expensive home version of Vista, you were out of luck. The only upgrade path that worked from XP Pro to anything with Media Center capability was the spendy Ultimate edition.



The Reliability Monitor provides a general idea of how stable your machine is. All our rigs are unstable.

'ONE MORE THING'

If the last eight years of watching Steve Jobs smugly introduce "one more thing" have taught us anything, it's that no matter how technically sound (or alternately, how fatally flawed) a product is, every major release desperately needs one or two supersexy features to incite lust in geeks everywhere. Every time Jobs rolls out a new product, he teases the audience with a feature or two that you simply cannot wait to use. These features not only leave customers clamoring for the new product but also give those pesky users sitting on the fence a rationale for upgrading. While Vista had the technical chops in the form of the Aero renderer to deliver some potentially astounding apps, Microsoft's best effort was Flip3D—a gimpy knock-off of a feature that OS X implemented infinitely better.

Aside from that, most of the apps included with Vista are rote updates of their forebears—from Movie Maker to Photo Gallery. There's very little that's new, even when the apps themselves are brand-new (see Windows Mail). Worse than nothing new, there's not much in a stock Windows install to inspire anyone—even the stereotypical dullard PC user.

FUN AND GAMES — NOT

An Exercise in Angering Potential Customers: DirectX 10

Vista was supposed to mark the launch of a new revolution in PC gaming, spearheaded by the full might of Microsoft as manifested in the Games for Windows initiative. With promises of everything from a fully fledged online matchmaking experience (a la Xbox Live), easier installations, and (most importantly) a host of killer AAA titles, Games for Windows looked poised to really challenge console dominance and modernize the PC as a gaming platform.

What Games for Windows actually did was tie the DirectX 10 API to Vista simply to drive sales of the OS. The first Vista-exclusive AAA Games for Windows title was a downright geriatric port of Halo 2, a game that originated with the first Xbox and doesn't use DirectX 10! To add insult to injury, there was no technical reason for a three-year-old ported Xbox game to be Vista-only. True, the community quickly released a patch that opened the door for XP gamers, but we still can't understand who possibly thought this was a good idea.

Microsoft continued down the suicidal Vista-only path for one more release, Shadowrun. Despite innovative gameplay and cross-platform support for its Xbox counterpart, the Vista-only release was enough to doom FASA Interactive, the studio that created the game.

The Benchmarks

We take a quantitative look at Vista and XP performance to determine exactly what penalty, if any, you pay when you upgrade to Windows Vista

To test Vista versus XP performance, we built what we think is a fairly middle-of-the-road rig—an Intel Q6600 quad core with 2GB of memory and a GeForce 8800 GTS videocard. We then ran a battery of benchmarks in three different OS environments: XP with Service Pack 3, Vista sans Service Pack 1 (with modern Nvidia drivers installed), and Vista with SP1. Our tests measure everything from overall system performance to network speed to gaming prowess.

OVERALL PERFORMANCE

Unsurprisingly, Windows XP remains faster in almost all of our standard system benchmarks. More noteworthy is how SP1 has improved Vista's performance, narrowing the gap between that OS and XP in key tests and even allowing Vista to surpass XP in our MainConcept encoder test.

Unfortunately for Vista, our desktop benchmarks do reveal areas where Vista continues to suffer substantial performance hits compared to XP, namely in ProShow and Quake 4. We've talked to the ProShow developers, and they don't know what causes the slowdown with their app in Vista, but they're investigating. We attribute the Quake 4 performance hit to poor OpenGL drivers in Vista.

As we mentioned before, we're perfectly willing to sacrifice a few percentage points of performance from an operating system upgrade. However, the difference between Vista SP1 and XP SP3 in ProShow and Quake 4 reaches a dismal 10 to 25 percent.

GAMING

We didn't include any DirectX 10 games in our tests simply because DirectX 10 wasn't around when Vista launched, and DirectX 10 graphics still aren't supported on Windows XP. Our basic system benchmarks already include a pair of games, FEAR and Quake 4, but we tossed in an additional round of 3DMark06 to further assess Vista's gaming prowess.

The results were informative. Aside from the already noted Quake 4/OpenGL deficiency, Vista performed admirably both with and without SP1, turning in scores equivalent to XP's. This tells us that the poor gaming performance we saw in the early days of Vista was more the result of immature drivers than issues with the OS. Of course, Microsoft can still be blamed for shoddy coordination with the graphics-card makers at the time of Vista's launch.

NETWORK TRANSFER SPEED

Our final set of benchmarks test networking performance. We set up the fastest NAS box we've ever tested, the QNAP TS-109 Pro, and ran our standard network storage benchmarks on it. While we saw the same stunning performance inadequacies from pre-SP1 Vista that we observed at the OS's launch, SP1 and the subsequent updates seem to have solved most of those issues. The minor gaps of a few seconds that do exist between XP and Vista SP1 are explained by the fact that XP shuts the file transfer window before the transfer is confirmed, while Vista waits until it has checked the copied file.

THE TAKEAWAY

With the exception of a couple outlier applications, Vista's performance is within striking distance of XP's, for the most part. Thanks largely to a series of performance enhancements and SP1, Vista has closed the gap in many areas where it was deficient. We're willing to overlook the poor OpenGL gaming performance simply because there aren't very many OpenGL games coming out, and it seems the ProShow problem is an isolated incident.

OVERALL SYSTEM PERFORMANCE

	WINDOWS XP (SP3)	WINDOWS VISTA (LAUNCH)	WINDOWS VISTA (SP1)
Premiere Pro CS3 (sec)	**924**	960	960
Photoshop CS3 (sec)	**133**	136	139
ProShow (sec)	**963**	1214	1275
MainConcept (sec)	1881	1822	**1814**
Quake4 (fps)	**143.5**	126.5	125.8
FEAR (fps)	65	65	65

Best scores are bolded. These are our standard system benchmarks, with one exception. We ran the games at 1920x1200 resolution, with 4x AA and 16x anisotropic filtering on FEAR, no AA and no anisotropic filtering on Quake 4.

GAMING PERFORMANCE

	WINDOWS XP (SP3)	WINDOWS VISTA (LAUNCH)	WINDOWS VISTA (SP1)
3DMark06 Game 1 (fps)	**29**	28	28
3DMark06 Game 2 (fps)	26	26	26

NETWORK TRANSFER SPEEDS

	WINDOWS XP (SP3)	WINDOWS VISTA (LAUNCH)	WINDOWS VISTA (SP1)
Network – Small to NAS (sec)	**38**	48	43
Network – Small from NAS (sec)	**39**	68	42
Network – Large to NAS (sec)	**139**	181	144
Network – Large from NAS (sec)	**140**	271	142

Best scores are bolded. Our NAS test consists of two file transfers, which we refer to as the small and large tests. The small test is 659MB spread over 180 files, while the large test is a single 2.8GB file.

Additional reporting by Benson Hong

Microsoft Concedes Vista Launch Problems

Abandoning the pretense that Vista is the perfect OS, Microsoft reps sat down with us to discuss the OS's problems in a (kind of) frank conversation

We were surprised when Microsoft reps agreed to discuss Vista's launch problems and what the company has done to fix them. We were surprised not only that they agreed to answer our questions with candor, but that they were speaking to us at all. Our initial conversation occurred in June and set the stage for the article you're reading. This dialogue also marked the first time in eight years that we had a private conversation with any Microsoft employee without a PR manager present. The answers we got during this mid-June background conversation were brutally honest: Our source, a high-ranking Windows product manager, conceded that Microsoft botched the Vista launch. He added that the company's biggest concern wasn't the OS but rather the eroded faith in Microsoft's flagship product among users of all types and experience levels.

Our conversation was refreshingly frank, and no topic appeared off limits. To wit:

- Our Microsoft source blamed bad drivers from GPU companies and printer companies for the majority of Vista's early stability problems.
- He described User Account Control as poorly implemented but defended it as necessary for the continued health of the Windows platform.
- He admitted that spending the money to port DirectX 10 to Windows XP would have been worth the expense.
- He assailed OEM system builders for including bad, buggy, or just plain useless apps on their machines in exchange for a few bucks on the back end.
- He described the Games for Windows initiative as a disaster, with nothing more than 64-bit compatibility for games to show for years of effort.
- He conceded that Apple appeals to more and more consumers because the hardware is slick, the price is OK, and Apple doesn't annoy its customers (or allow third parties to).

Yes, the June conversation was dazzlingly candid, and we were looking forward to an equally blunt follow-up meeting—a scheduled late-July on-the-record interview with Erik Lustig, a senior product manager responsible for Windows Fundamentals. But then the universe as we know it returned to normal, and Microsoft became Microsoft again. Our interview with Lustig was overseen by a PR representative and was filled with the type of carefully measured language that we've come to expect from Microsoft when discussing "challenges." A "challenge" is Microsoftese for anything that isn't going according to the company's carefully choreographed plans. In the text that follows, we've combined the information conveyed during the mid-June background conversation with decoded translations of the "on the record" conversation we had in July. The contrast between the two interviews is stunning.

We herewith give you a snapshot of Microsoft's take on Vista launch problems.

MICROSOFT'S TO-DO LIST

Admitting to Unfinished Business

Microsoft has acknowledged—and addressed—several of Vista's shortcomings over the last 18 months. However, the company willingly concedes there are a few key areas that still need attention:

› USER ACCOUNT CONTROL "UAC was a version-one technology in Vista, and it was made for some very good reasons," said Lustig. "Of course, we know that [it causes some of] the compatibility issues and frustration issues [in Vista]. There are opportunities to continue [to improve how UAC interacts with the user]."

› ACTIVATION Activation annoys us. It punishes paying customers by forcing them to phone-activate their machines, yet pirates avoid the annoyance entirely. Microsoft acknowledged this irony but still stands behind activation. "Just because a particular technology has a loophole that some dishonest folks have figured out doesn't mean we shouldn't invest in an activation technology to bring value to the platform for consumers," Lustig said. "If we can provide additional value [to paying customers] now and in the future, that's really what the advantage is."

› VERSION OVERLOAD Users who want to purchase Vista are still faced with a paralyzing set of choices. With no fewer than four editions of Vista on retail shelves, it's difficult for a normal consumer to know what they actually need. From conversations we've had with Microsoft insiders, we know they're aware of the problem and are addressing it with Windows 7. Whether that's by reducing the number of versions or adding functionality to further differentiate Windows flavors, we don't know.

STABILITY

According to now-public internal Microsoft memos, 18 percent of all Vista crashes reported during the months immediately following its launch were due to unstable Nvidia graphics card drivers.

Microsoft has never issued any public comment concerning who's to blame for the driver crashes, but during our background conversation, our source conceded that hardware OEMs were writing WDDM (Windows Display Driver Model) drivers for a moving target during Vista's beta and release-candidate periods. Our source told us that because of low-level OS changes, hardware vendors didn't have sufficient time to develop and test their drivers. This mirrors what Steven Sinofsky, the head of the Windows team, said in an interview with Cnet earlier this year: "The schedule challenges that we had, and the information disclosure weren't consistent with the realities of the project, which made it all a much trickier end point when we got to general availability in January."

Launch problems aside, once Vista is updated with SP1, it seems much more reliable than it was early on. The Maximum PC Lab isn't equipped for long-term stability testing, but in our anecdotal experience, Vista's stability problems are largely fixed, even on somewhat exotic hardware. Whether Vista is more stable than WinXP really depends on the actual hardware configuration you're using more than anything else.

COMPATIBILITY

While discussing this story on background, Microsoft placed blame for incompatible software and hardware on its third-party partners. However, during our on-the-record chat, Lustig simply said, "I honestly don't have the exact numbers for that," in reference to the ratio of crashes attributed to Microsoft versus third-party entities.

Regardless, we're well aware that Microsoft had been talking to hardware and software developers about Vista compatibility issues since the 2005 Meltdown, Microsoft's annual gaming conference. At that conference, Microsoft informed game developers that they needed to write apps that behaved well, or they would face problems with Vista. The requirements were, for the most part, simple—caveats like not writing to C:/Program Files/ or C:/Windows/.

It's also important to note a shameful truth that everyone in the PC industry is aware of but rarely discusses: When a new OS comes out, third-party vendors will often withhold compatibility support in order to drive sales of new units, turning the cost of supporting a new OS from a liability into a source of revenue. The same goes for software like antivirus utilities and some CD/DVD burning apps, both of which hook into the OS very closely.

SECURITY

The statistics on Vista's security record are clear: Vista is the most secure version of Windows to date. Nonetheless, Lustig said that Microsoft made "changes that have had some short-term ramifications that we've worked very hard the last year and a half, and through Service Pack 1, to address." Some of these changes may have had unintended negative consequences, but Vista has suffered fewer security defects than any previous version of Windows. In short, sometimes you just have to give up flexibility for security. As Lustig told us, "I believe that those changes are going to be a fundamental basis for the integrity of the platform." We agree.

GAMING PERFORMANCE

During our initial June interview, Microsoft blamed unoptimized videocard drivers for poor gaming performance. To confirm this, we tested both the launch version of Vista and the post-SP1 version of Vista with current Nvidia drivers. Our gaming tests showed only the most negligible performance differences between the two OS builds, confirming that Vista itself was not to blame for early game performance issues. Rather, those earliest Vista videocard drivers were the culprits. Indeed, now 18 months after its launch, Vista's performance is within striking distance of WinXP's in almost every test we ran.

THE IMPACT OF SP1

Because Vista's first Service Pack significantly improved the struggling OS, we were surprised that Microsoft didn't tack a Second Edition label on it, a la Windows 98. Providing measurable improvements in performance and stability, Service Pack 1 should have been Vista's saving grace. No? Lustig told us that despite significant improvements in most of Vista's deficient areas, "there is a lot of leftover concern [about Vista] based on information folks have heard anecdotally."

Quite an admission. Lustig continued, "The challenge for Microsoft isn't necessarily continuing to take the feedback and improving the product—we've been doing that since launch and will continue to. The challenge is getting the message out that we've listened, we've made very positive changes, we're seeing very positive results from the changes we've made, and there's enough value in the product."

THE UPSHOT

Maximum PC's Final Word on Vista

After spending the last six weeks getting down and dirty with the OS—on multiple hardware configurations, in both 64-bit and 32-bit flavors, and on mobile and desktop systems—we're willing to give it a second chance. There are still tons of things about the OS we're not happy with—starting with the now-$350 Ultimate SKU and working down from there—but from a performance, stability, and security standpoint, we're satisfied with where Vista is today. You no longer need to sacrifice performance or stability if you want to run the latest version of Windows.

If you already have Vista, there's no reason not to use it, but should you go out and buy Vista today? Probably not. With Windows 7's launch scheduled for early 2010, we're actually closer to that date than we are to Vista's launch. If you've ridden out the storm on XP so far, it probably isn't worth investing in Vista for just a year and a half of use.

What Microsoft Must Change for Windows 7

By now, we've got a pretty good idea of what's working and what isn't in Vista. Here are our recommendations for how Microsoft should proceed with Windows 7

Fight Piracy a New Way

Face it, activation is a failure. For power users who frequently upgrade their PCs, dialing in to reactivate the OS is beyond irritating. Instead, Microsoft must come up with a novel way to punish pirates without annoying its paying customers. (May we suggest displaying massive popup ads in pirate copies of Windows?) For legitimate customers, a realistic home-licensing program—buy one copy at full price, get four more upgrades for $50 to $100 each—would go a long way toward creating goodwill.

Streamline the UAC System

We definitely approve of the spirit behind User Account Control—it's good to warn users when they're doing something risky. However, the implementation is so chatty that it trains users to automatically click Approve on any popup they see. This is insanely dangerous behavior that must be fixed in Windows 7.

Turn User ...
Turn on User Account Control (UAC) to make your computer more secure
User Account Control (UAC) can help prevent unauthorized changes to your computer. We recommend that you leave UAC turned on to help protect your computer.
Use User Account Control (UAC) to help protect your computer

Add Something Inspirational

Say what you like about Steve Jobs, but he stirs the Apple faithful into a frenzy with his promise of "one more thing." Apple has done a great job of adding features, applications, and functionality to OS X that inspire its users. Some of that is just marketing mumbo jumbo, but the tight integration and the user-focused design of Apple's integrated apps impress even the most die-hard PC user.

64-Bit is the New 32-Bit

It's time. The 64-bit revolution is upon us, and it's time for Microsoft to lead the charge. The hardware is available and common, and software vendors should have been planning for the 64-bit change for the last five years. Please, Microsoft, make the 64-bit edition of Windows 7 the default install. And while you're at it, allow users to install the 32-bit and 64-bit versions of Windows on the same machine without buying two licenses. Anything less is just crass.

Create Fewer Versions

We understand that creating many versions of an OS with a few key differentiators can help drive sales at the higher end. But it's a viciously consumer-unfriendly practice that needs to be stopped. Nothing's worse than finding out you've purchased the wrong software or that because of obscure upgrade paths you're railroaded into buying an incredibly overpriced version of the OS whose only differentiating factor is that it works with your rig. Actually, one thing is worse: finding out you can't return that already opened Vista box for a version you can use.

Jettison Backward Compatibility

So many of Vista's problems are directly tied to backward compatibility, but we have the perfect solution. Instead of building backward compatibility into the OS, ship each copy of Windows with Virtual PC and bare-bones images of Windows XP. Let users run old apps in a virtualized OS, and strip out all the cruft that's required to make them run natively in Windows 7.

Make Performance Paramount

We expect to take a small performance hit in games anytime we upgrade our operating system. We don't like it, but we understand that it's the way things go. What we can't abide is taking massive performance penalties in basic computing tasks—like transferring files over a network. There's no wiggle room on this one: Get it right the first time.

Upgrade DirectSound3D

A picture may be worth 1,000 words, but we like good audio too. There's more than enough blame to pass around between Creative and Microsoft for Vista's sound woes. At this point, we don't care who is at fault, we just want a successor to DirectSound 3D in the next version of Windows and DirectX.

the new wave

buying a new monitor can be tricky. First, you must decipher the manufacturer doublespeak. Not all specifications are created equal, nor are they measured fairly: You truly can't tell a book by its cover, nor a monitor by its box copy. And then there are the displays themselves. A monitor by itself might look good to you, but you won't know what you're missing unless you compare it against the competition.

That's why we're here to help. The market is

# of LCDs

Before you buy a new flat panel monitor, know what features matter. Here's how 10 of today's LCDs compare in size, specs, and price **BY DAVE MURPHY**

flooded with configurations, technologies, and sizes that might look good on paper or even attractive in the store, but that doesn't mean these monitors represent the best of their class. You owe it to yourself to understand all the options. What does color gamut really mean? How do you know if a panel has 6-bit or 8-bit color depth? And how do those matters and others impact the overall image quality of a screen?

We're going to walk you through the basics of today's LCD monitor technology and what it means to you, a consumer who wants the best picture for your pennies. But we're not going to leave you hanging: We're also going to review 10 monitors across a wide swath of sizes and prices to give you a head start on your purchasing decision.

In the end, you'll get the picture—the picture you deserve!

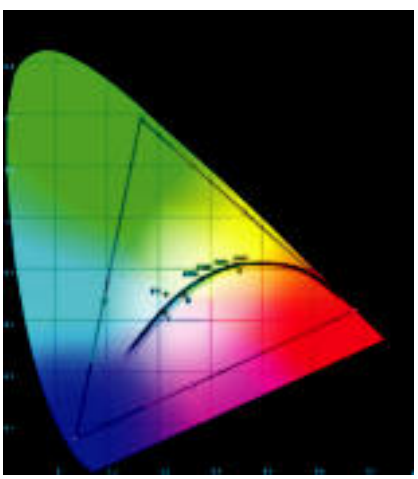
BUYERS GUIDE

Understand the Technology

What's important? What's hype? What do those numbers on the box mean? We're glad you asked

COLOR GAMUT

The human eye can perceive a far more expansive range of colors than a computer or television display can produce. The subset of colors a display is capable of producing is defined as its color gamut. Typically, a display's gamut is measured as a percentage of the National Television System Committee (NTSC) color standard, with 72 percent of that range being standard for LCDs. Recent technology advances, however, have enabled displays to reach 92 percent and even beyond 100 percent of the NTSC. But the expanded range of colors can come at the cost of color precision if a display's color depth hasn't increased as well.



The triangle in the center of this chromacity diagram represents the NTSC color gamut, used to measure the color output of LCDs.

COLOR DEPTH

An LCD's color depth defines the number of levels that each primary color can render. In an 8-bit panel, the red, green, and blue channels of a pixel are capable of 256 levels each. Multiplied, that makes for a total of 16.7 million possible colors. (This number doesn't change if the display's color gamut broadens; the space between colors only widens, thereby diminishing color precision.) With 6-bit LCD panels, which are increasingly common, the red, green, and blue subpixels of a single pixel are capable of just 64 levels each for a total of 262,144 colors. That's a big drop from their 8-bit counterparts. To compensate for the difference, manufacturers use techniques such as dithering and frame-rate control on 6-bit panels to expand their palettes. Traditionally, these techniques have been able to elicit up to 16.2 million colors, but it's now common for 6-bit panels to claim 16.7 million colors, making it difficult for consumers to discern whether a display is actually an 8- or 6-bit panel. See the sidebar on this page for more on this issue.

BACKLIGHT

The vast majority of desktop LCD monitors have backlights made of cold-cathode fluorescent lamps (CCFL), but the use of LEDs for backlights is rising. LED backlights use a grid of either white or mixed red, blue, and green LEDs to create the display's backlight. In the latter case, the panel's color is theoretically improved because the back-

TFT COMPARISON

Know Your Panel's Lineage

While all modern LCD monitors fall under the thin-film-transistor (TFT) classification, subsets within that class bear notable differences. These are the most common types of TFTs:

→ TN (Twisted Nematic): The most inexpensive and commonly used TFT, TN panels are known for having extremely fast pixel response times and a 6-bit color depth. These panels feature inferior viewing angles and lower color fidelity than S-IPS or S-PVA panels.

→ S-IPS (Super In-Plan Switching): Considered to be the best overall TFT in terms of color reproduction and viewing angle, S-IPS panels are often sold at premium prices, so they're sold by a limited number of manufacturers. The panels have 8-bit color depth, although black and dark grays can take on a purplish hue at wide viewing angles. And the overdrive technology manufacturers use to elicit faster pixel response times from these panels can introduce noise into videos, unless your monitor or videocard comes with a built-in noise-reduction function.

→ S-PVA (Super Patterned- ITO Vertical Alignment): S-PVA panels also have 8-bit color depth and better color reproduction and viewing angles than TN panels. S-PVA panels feature better contrast and black levels than both TN and S-IPS panels, and S-PVA is usually the panel type found in higher-quality (but not professional) monitors.

Increasingly, LCD monitors sport newer video interfaces, such as HDMI, alongside the trusty DVI port.

light matches the color filters of the pixels themselves. Besides producing a wider color gamut, LED displays are also able to achieve a deeper black than standard CCFL monitors. On the other hand, LEDs are more expensive than CCFLs, and individual LEDs can, potentially, age at different rates.

INPUTS

Ideally, you're not planning to connect your new LCD monitor with a VGA cable. That analog standard is old and moldy, and it's preferable to maintain a digital signal from your computer to the display. While LCD displays should come with at least one DVI port, that standard is being augmented by newer, more capable digital interfaces such as HDMI and DisplayPort. Both offer greater bandwidth than DVI (which is crucial for displays with resolutions greater than 1920x1200), HDCP-support for playing copy-protected content, and the ability to carry both video and audio signals over the same thin cable. While HDMI has more market penetration on videocards than DisplayPort, adapters will allow you to connect your videocard's DVI port to your display's HDMI or DP input.

HDCP

Put simply, if your display doesn't support HDCP (High-Definition Copy Protection), you won't be able to watch commercial HD DVD or Blu-ray movies in full resolution on your display.

CONTRAST RATIO

Don't pay attention to contrast ratios: They're all hype, as each display manufacturer will engineer its own testing situation, so there's no basis for meaningful comparison.

Manufacturers have recently taken to touting a screen's dynamic contrast ratio, which is typically a higher (thus more impressive) number than standard contrast ratio, although the techniques for measuring this are just as suspect.

Some monitors offer a dynamic contrast feature that performs on-the-fly adjustments to contrast in order to enhance the grayscales of the given content. The downside is that these adjustments aren't always analyzed correctly—your picture can be thrown too far into either the dark or light extreme. Worse, if consecutive scenes in a movie or game differ dramatically, you'll likely notice the image fading in and out as the display adjusts to the content.

PIXEL RESPONSE TIME

Quite simply, pixel response time refers to how long it takes a single pixel to transition from one state to another. Just like contrast ratios, pixel response measurements are entirely at the mercy of the manufacturer. A slow pixel response time can result in ghosting in fast-moving content such as games.

LEARN MORE AT MAXIMUMPC.com
http://tinyurl.com/5chq4a

Planar PL2210MW

Plain, indeed

Planar's PL2210MW display is a classic representation of your average 22-inch display—a 6-bit TN panel that bears the mediocre image quality of that class. In DisplayMate, the 1680x1050 display's grayscale range was acceptable, although it fell apart at the light end in both the grayscale test and when the screen was tasked with producing very light colors against a white background.

More frustrating, the PL2210MW was unable to produce a solid black or white that wasn't tinged with gray. The display's grayscale gradients also feature an unwelcome yellow tint that showed up in the grays of our real-world tests.

We didn't experience any issues with the PL2210MW in our gaming tests, save for the contrast and saturation lapses previously mentioned. These problems hurt the display as a movie-watching platform, as a number of scenes just couldn't achieve the true black they demanded. Color reproduction on our high-definition photos was of average quality. While we weren't unhappy with the results, we've tested a number of other monitors that produce more color and vibrancy in our test images.

We were troubled by the display's anemic speakers and lack of onscreen display options for audio configuration. We'd rather do without the subpar attempt and pay less for the product. With support for only DVI and VGA inputs, the PL2210MW stands solidly in the middle of the pack.

SPECIFICATIONS	
VIEWABLE AREA	22"
NATIVE RESOLUTION	1680x1050
INPUTS	VGA, DVI
PANEL TYPE	TN

The bare-bones PL2210MW isn't much to look at when it's off. It isn't much to look at when it's on, either.

VERDICT **6**

PLANAR PL2210MW
$275, www.planar.com

Gateway HD2201

Technical flaws reduce the value of this monitor

We want to like this monitor, but too many issues stand in the way.

In DisplayMate, Gateway's HD2201 consistently reproduced dark grayscale values, pushing out more dark shades of gray against a black background than we typically find from monitors of its class. The same can't be said of the HD2201's merely average ability to reproduce light shades of gray against white.

When tasked with reproducing DisplayMate's more demanding grayscale ranges, the HD2201's performance was marred by banding, in which dark lines of compression disrupted what should be a smooth, contiguous transition. Mild color-tracking issues were also evident in these scenarios. This problem makes shades of gray take on a subtle red, green, or blue hue at random intervals. And like Planar's 22-inch LCD, the HD2201's grays are tinted warm by default, in both DisplayMate and real-world environments.

The display's deficiencies resulted in diminished detail in brighter scenes, such as the flaming wreckage of BioShock's opening segment. Still, the HD2201's contrast, colors, and detail shine in darker scenes—thanks to an assist from the display's glossy panel. Such screens tend to produce richer colors and a deeper black than matte panels, and the HD2201 is no exception.

Were it not for the HD2201's glossy panel, we don't think we'd be as impressed with this monitor's picture.

The monitor is laden with connection options, though it lacks optimized presets for different multimedia content.

Even given its technical failings, the HD2201's splendid darker coloration and input options are enough to squeak it past displays like Planar's PL2210MW—but barely so.

SPECIFICATIONS

VIEWABLE AREA	22"
NATIVE RESOLUTION	1680x1050
INPUTS	VGA, DVI, HDMI, Component
PANEL TYPE	TN

VERDICT **7**

GATEWAY HD2201
$320, www.gateway.com

Envision G2219w1

We can envision only a few improvements for this sweet monitor

We are ashamed to have mentally cast off Envision's G2219w1 at first glance because it looked like a budget monitor. It's budget in price only, for this 22-inch display offers exceptional picture quality for its class.

It wasn't perfect, though—Envision's display didn't reach the same level of gray detail at the dark end of the grayscale as Gateway's, but it was extremely close. Envision's display beat out Gateway's at the light end of the spectrum by, again, a very close margin.

Given their relative similarity in black-and-white gradients, we didn't expect to see a huge difference in the monitors' respective color saturations. But the G2219w1 was able to display a full range of lighter colors against a white background far better than the HD2201.

We would ask that subsequent versions of the G2219w1 address the limited space between the display's stand and its DVI connector.

SPECIFICATIONS

VIEWABLE AREA	22"
NATIVE RESOLUTION	1680x1050
INPUTS	VGA, DVI
PANEL TYPE	TN

The latter showed acceptable performance on its blue and red shades and completely crapped out with its greens.

Given its strong DisplayMate performance, we expected the G2219w1 to perform well with real-world content. And it did. While the overall color saturation was stronger on the G2219w1 than the HD2201, the latter brought out additional detail and improved coloration in darker scenes. For example, we'd much prefer the HD2201's picture when staring at the murky steps at the beginning of BioShock, but we'd take the G2219w1's depiction of the flames in the game's opening scene any day.

No banding or color-tracking issues popped up in our tests, nor did the display suffer from any image ghosting or other abnormalities in our real-world tests. But we did encounter a frustrating problem with the display's DVI input. Due to the proximity of the port to the display's base, it was difficult to attach a DVI cable to the monitor. It wasn't enough to reduce our appreciation of this display's overall prowess, however. We place this monitor above the Gateway HD2201 in overall quality. It's not a perfect 22-inch display, but it's the best one we've ever tested.

VERDICT **8**

ENVISION G2219W1
$270, www.envisiondisplay.com

ViewSonic VX2240w

Get ready to tweak

ViewSonic's VX2240w is unwatchable at its factory default setting—the screen's brightness is cranked beyond the point of acceptable image quality. Fortunately, we were able to tweak the display's settings to produce an image that was at least similar in quality to the Gateway HD2201's. While the VX2240 matched the HD2201 tit for tat in its ability to produce lighter shades of gray on a solid white background, the former exhibited better color saturation in the lighter shade levels.

Flesh tones on the VX2240 appeared more lifelike compared to those of the HD2201, and the former even offers two additional color temperature settings for picture customization. This monitor displayed no banding issues and only a few color tracking discrepancies on the most demanding black-to-white gradients, but it does suffer from a critical flaw.

When you change its color temperature, the VX2240w is sometimes unable to produce its full range of dark or light contrasts. This sucks the quality out of a normal picture, but flipping the display on and off brings back normal settings. Still, it's the kiss of death for the VX2240w.

Something unusual happens when you adjust this monitor's coloration options.

SPECIFICATIONS

VIEWABLE AREA	22"
NATIVE RESOLUTION	1680x1050
INPUTS	VGA, DVI
PANEL TYPE	TN

VERDICT **5**

VIEWSONIC VX2240W
$410, www.viewsonic.com

The FHD2401's mighty speaker bar wins the sound portion of our display testing, no question.

Gateway FHD22401

Its glossy panel doubles as a mirror

The Gateway FHD2401 hits a ball or two out of the park, but we're not terribly impressed by this 24-inch panel's overall performance.

The display's grayscale performance favors the darker side of the spectrum. The FHD2401 is able to distinguish among shades of gray against a black background, but a below-average showing in lighter grayscales hurts overall performance. Worse, banding and color-tracking discrepancies permeated the darker end of the grayscale when the monitor was tasked with producing 256 different shades.

The 1920x1200 display touts a 92-percent color gamut, which made for rich coloration in our real-world suite of tests. But the display's visuals aren't the best we've seen—in our movie, game, and image-quality tests, the images were lacking minor details on both ends of the grayscale spectrum compared to the best panels we've tested.

The FHD2401 offers support for HDMI, VGA, and DVI inputs, but no component input. You can't adjust the monitor's height either, a sloppy omission for a monitor in this size class.

SPECIFICATIONS

VIEWABLE AREA	24"
NATIVE RESOLUTION	1920x1200
INPUTS	VGA, DVI, HDMI
PANEL TYPE	TN

VERDICT **7**

GATEWAY FHD22401
$470, www.gateway.com

Acer P244w

Adjustable height is a requirement, not a bonus

Acer's native-1080p display wins points for hitting the widescreen 16:9 formfactor, but the P244w treats its colors with the same unpleasantness it treats its grayscales. The monitor's color saturation suffers from a reduced range on both the top and bottom ends of the spectrum: Colors lose their vibrancy as they get darker and become washed out as they get lighter.

The P244w offers acceptable detail in its grayscales in our synthetic tests but still displays less detail in an image than other monitors we've tested in our real-world routines. And we didn't enjoy how dark scenes in our real-world movie tests always looked tinted by a bit of unnatural brightness—we much prefer a richer, deeper black.

Start saving your phone books: You can't adjust the height of this display. And we dislike how the display's presets don't appear to vary the image quality very much at all. The P244w's list of connections—DVI, VGA, and HDMI—lacks the component option that higher-quality displays often come with. We'd prefer a monitor that has more: picture quality, connections, ergonomic options—anything.

When the P244w is on, you're treated to bleeding backlight on the screen's top and bottom edges during darker scenes.

SPECIFICATIONS

VIEWABLE AREA	24"
NATIVE RESOLUTION	1920x1200
INPUTS	VGA, DVI, HDMI
PANEL TYPE	TN

VERDICT **6**

ACER P244W
$360, www.acer.com

Samsung 245T

This isn't a perfect display, but it wins the fight

We meant to Photoshop a Best in Feature ribbon to this display, but we didn't want to tarnish its beautiful front.

It's no secret that the expensive Samsung 245T hosts an S-PVA panel beneath its slim black exterior. But this display's performance is certainly worth the price. The 245T offers a stunning picture for its class, trumping our longtime favorite 24-inch panel, Dell's 2407WFP, and even its latest rev, the 2408WFP (reviewed below).

This 1920x1200 display boasts a 97-percent color gamut and the effect is clear. The 245T dishes out notably vibrant blues, reds, and greens, and its color saturation remains strong at even very light levels. To us, the display's colors feel just right: crisp and bold without any hint of oversaturation. But even if you disagree, the monitor comes with a number of preset options for tweaking the coloration to your exact preferences. We found success using the Mild preset, as Normal made images appear drab and Brilliant made our images look like a supernova.

We were equally impressed by the 245T's range of grayscales. The display is able to reproduce more details as its darker grayscales turn to black than any other monitor we've ever tested. Its light grayscales are similarly expansive. The 245T's healthy grayscale range translates into superior detail on high-definition images and movies.

Our criticisms of this monitor are few, but strong: We dislike the 245T's optional dynamic contrast feature, as it treated us to a healthy dose of image fades whenever our movie of choice, *V for Vendetta*, switched between scenes of varying brightness. Nor did we like the 245T's lack of single-button contrast adjustments. You can adjust the monitor's brightness, but not the contrast, without having to traverse a number of OCD screens.

The 245T supports just about any input connection you might use, including VGA, DVI, component, and HDMI. You can swivel, tilt, and raise the monitor at your leisure, and even flip the whole panel to portrait mode. Five included USB ports sweeten the deal, but we don't need any more convincing. With features as strong as its picture, the Samsung 245T is the monitor to beat in its size class.

SPECIFICATIONS

VIEWABLE AREA	24"
NATIVE RESOLUTION	1920x1200
INPUTS	VGA, DVI, HDMI, S-Video, Component
PANEL TYPE	S-PVA

VERDICT **9**

SAMSUNG 245T
$800, www.samsung.com

Dell 2408WFP

An improvement and an imperfection, all in one

Do not try to distinguish the 2408WFP from the 2407WFP. For all intents, they are the identical twins of Dell's display world.

Dell's 2408WFP is the latest in the company's line of 24-inch panels, following on the heels of the much-beloved Dell 2407WFP (reviewed September 2006). Unfortunately for Dell, improving upon its predecessor isn't enough to push the 2408WFP above other tested displays.

The Dell's grayscale performance in DisplayMate was great, matching the range of Samsung's 245T on the light end, although it didn't quite match the 245T's abilities at the darker end of the spectrum. These subtle differences became more apparent in our real-world testing, as both our gaming and movie benchmarks looked a bit darker on the 2408WFP than what we're used to seeing. And we also had less detail in our high-res still images compared to what the 245T was able to produce.

Although it comes with a number of presets, none were able to alleviate the loss of detail we experienced without creating other issues at the same time. The unnatural, over-the-top brightness added by the display's multimedia and gaming presets is simply unacceptable. Similarly, the 2408WFP's 110-percent color gamut lends images far more color saturation than we're comfortable with. Even the grayscales themselves are tinted by a mild green hue.

The 2408WFP comes with a number of connectors: HDMI, DVI, VGA, and component video, as well as a built-in USB hub and 9-in-2 media card reader. Dell also throws in a DisplayPort connector for the few people who run DP-capable videocards.

We applaud Dell's 2408WFP for its efforts. While its saturation comes off a bit strong, we'd use this monitor on our desk without reservation—unless someone was offering us Samsung's 245T too.

SPECIFICATIONS

VIEWABLE AREA	24"
NATIVE RESOLUTION	1920x1200
INPUTS	VGA, DVI, HDMI, S-Video, Component, Composite, DisplayPort
PANEL TYPE	S-PVA

VERDICT **8**

DELL 2408WFP
$680, www.dell.com

Hannspree HF289HJB

Acceptable performance for a beastly large display

Size is important, but so is quality. Hannspree's 27.5-inch HF289HJB fits the former just fine, but its average performance makes us yearn for a better-quality picture to fill the massive screen.

We had to crank the brightness on this 1920x1200 display to the maximum level to achieve the best results in DisplayMate's series of grayscale tests. Even after this adjustment, the display reproduced less detail in its darker values than any other monitor in this feature. The HF289HJB isn't as bad on the lighter side of the spectrum, but it's not good enough to compensate for the limited range of dark values.

The HF289HJB had more trouble producing lighter colors against a white background than other monitors we've tested. This resulted in skin tones that looked washed out in our real-world testing situations. On the gaming front, our Call of Duty 4 run-through lost a bit of its visual flair. The shades of green in the image suffered the most, and black scenes as a whole appeared slightly tinted with blue.

If we had our way, we would have made a few changes to this monitor. For starters, the display doesn't come with any presets. None. We tweak our displays, but not everyone enjoys fiddling with the nuances of brightness, contrast, and color. We'd also fix the HF289HJB's strange audio setup. The single included speaker sends out its mono sound from the back of the display. This creates a strange auditory effect that could easily be improved by replacing it with two front-facing speakers.

You can adjust the height and angle of this mammoth monitor, but not pivot it or change it to portrait mode. But that's OK: There are far more changes this panel needs than increased ergonomic options for it to be a king of the huge displays. We'd rather spend the cash on a better-performing, smaller panel.

SPECIFICATIONS

VIEWABLE AREA	27.5"
NATIVE RESOLUTION	1920 x 1200
INPUTS	VGA, DVI, HDMI, Component
PANEL TYPE	TN

VERDICT

HANNSPREE HF289HJB
$580, www.hannspree.com

6

No banding? No color-tracking issues? The HF289HJB avoids these problematic picture issues entirely.

Word to the wise: A monitor's brightness isn't like whipped cream. Overloading the display's luminosity won't make the picture any sweeter.

Westinghouse L2610NM

No adjustments could save this display

Taking a cue from ViewSonic's playbook, Westinghouse's L2610NM produces a crappy image out of the box. We haven't seen a display ship with such a whited-out picture in a long time. And unlike ViewSonic's VX2240w, adjusting the L2610NM's brightness and contrast settings does little to help matters. Switching through the display's color temperatures requires a large contrast adjustment, as moving from one mode to another tends to wash out a huge section of the display's lighter grayscales.

The color saturation on the 1920x1200 display suffers from its overly bright settings. It trades richness and vibrancy for a brightness that can overpower the natural look you'd expect images, and even your desktop, to have. Colors look white, blacks look gray—everything looks far more washed out than we'd ever want. Depending on which color temperature we picked, the monitor's grayscales were imbued with various tints of color. We were unable to find a true black-to-white gradient even once.

We'd normally list the connections this display carries right here, but it's irrelevant; we don't want you connecting anything to this 26-inch spotlight.

SPECIFICATIONS

VIEWABLE AREA	26"
NATIVE RESOLUTION	1920x1200
INPUTS	VGA, HDMI
PANEL TYPE	TN

VERDICT

WESTINGHOUSE L2610NM
$500, www.westinghousedigital.com

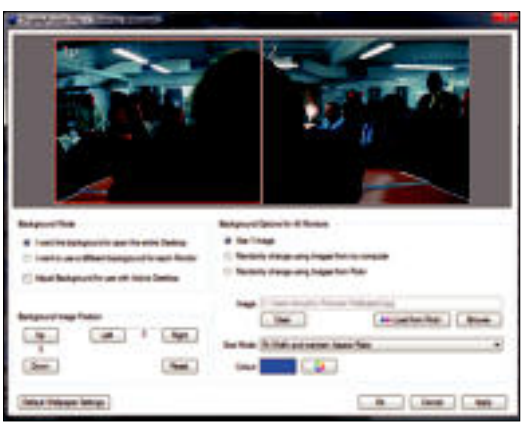
4

Multi-Monitor Mayhem

Like us, you've probably found that a single screen doesn't cut it anymore. Here are two apps that will help you make the most of your multi-mon setup

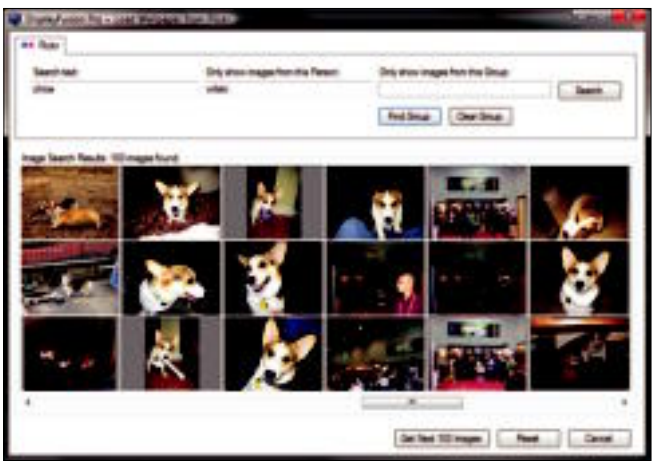
DISPLAYFUSION

If you're tired of using third-party photo-editing applications to get your desktop wallpaper to span multiple displays, you're in luck. The 15-day trial of DisplayFusion (www.binaryfortress.com) allows you to customize every last inch of your desktop, and the $10 pro version opens up access to Flickr and wallpaper randomization modes.



The program's main screen is the meat of the application. From here, you can set up a single wallpaper that spans any number of displays, or you can individualize each monitor with a different wallpaper: perhaps a loving portrait of your family alongside your favorite sports team (or sports team's cheerleading squad).

Randomizing your desktops' wallpapers is as easy as clicking a button. The program will swap your wallpapers in and out up to once a day. We recommend you not set them to change every minute unless you want to turn your desktop into a screensaver of sorts.



DisplayFusion is unique in its ability to pull down images from any Flickr user and make them into wallpapers. It's a great feature for the photography enthusiast, as you can then use the application to create a rotating slide show of wallpapers based on everything you upload to your account.

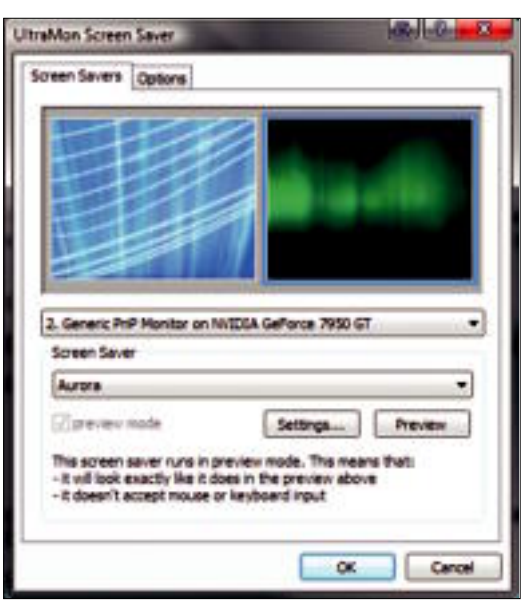
Or you can aim one step higher. Using a series of keywords and group filters, you can turn your wallpaper into an endless stream of new images centered on your specific interests. It's a perfect solution if you're tired of the same ol', same ol'.

ULTRAMON

Consider UltraMon (www.realtimesoft.com) the jack-of-all-trades for your desktop interface. While it doesn't offer as much wallpaper functionality as DisplayFusion, it includes a plethora of other desktop features. A 30-day trial lets you try the app out, after which you have to pay $40 for the full version of the program, which includes a year's worth of updates.

UltraMon builds a ton of functionality into its minimal interface. The program adds additional buttons to the top of your windows that allow you switch a window from one monitor to another without having to drag it over yourself. A second button lets you span your current window across all of your displays.

You can also assign these commands—and a host of others—to individual hotkey combinations through UltraMon's extensive options menu. And you can opt to have UltraMon regulate your windows' dimensions when moving between displays of different resolutions.


UltraMon Screen Saver
Screen Savers
Options
2. Generic PnP Monitor on NVIDIA GeForce 7950 GT
Screen Saver
Aurora
Settings...
Preview
This screen saver runs in preview mode. This means that:
- it will look exactly like it does in the preview above
- it doesn't accept mouse or keyboard input
OK
Cancel

One of the more frustrating issues for multi-monitor users is that it's impossible to make Windows screensavers run on more than one display at once. You can certainly download multi-monitor-friendly screensavers, but the ones that come packaged with Windows XP work on only one display—unless you have UltraMon, that is.

The utility not only lets you run separate instances of your screensaver across all of your displays but also allows you to assign a different screensaver to each display. Balance out a slide show of your college days with a good ol' Windows logo.

MAXIMUM PC'S GUIDE TO FRIDAY AT 4:00 PM

Stop watching that clock! These 12 browser-based games are sure to make time fly

BY BENSON HONG AND REED PORTER

It's the final hour—the last stretch in your race to freedom. Paper footballs litter your desk and paper basketballs surround the trash can. Yet even after these sporting events have ended, the little hand continues to hold a grudge against the 5. It's high time you find a more efficient—and less obvious—way to pass the time.

Consider this your go-to guide against workplace stagnation. We've spent dozens of hours scouring the Internet in search of the most enjoyable and alt-tabable browser-based games. They require no installation and, best of all, are 100 percent free. When the boss man walks by, you can easily switch to that budget report for accounts payable—he can't fault you for grinning like a fool at a spreadsheet!

ACTION

Indestructo Tank AE

Who says a 5-ton vehicle can't do flips?

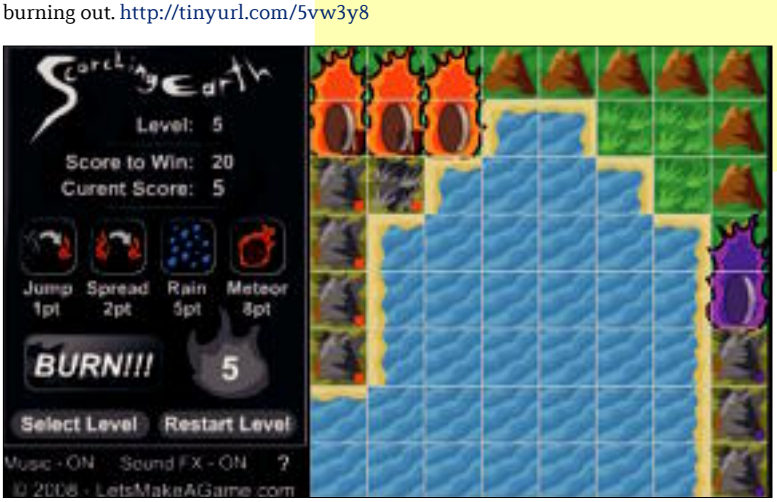
If you haven't experienced the previous versions of Indestructo Tank, then this anniversary edition is a stone-cold must play. Enemy fire drops on you from copters overhead, but rather than run from it, you want to place your rough-and-tumble tank directly in its path! Each explosion will propel your vehicle skyward, allowing you to take out the enemy units while in flight! The longer you remain airborne, the more experience points you earn. Use the points to purchase more—yes MORE—enemies to help you catch some gnarly air. Move fast, as your limited fuel supply will dwindle and leave you stranded in enemy territory. Down for some team play? Tag team with a buddy and play the co-op mode in which the enemy has developed a missile that can destroy the Indestructo Tank! Have your friend control the Indestructo Copter and destroy these missiles before they destroy you! http://tinyurl.com/5vps9a

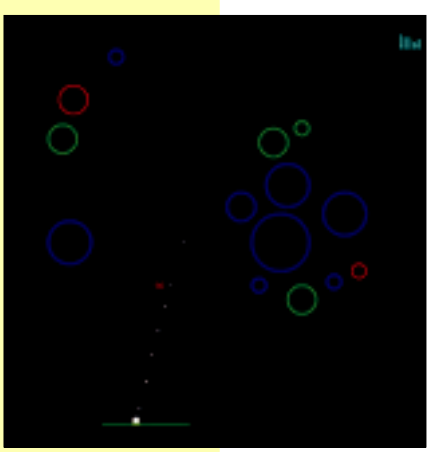
PUZZLE

Scorching Earth

Pyros, rejoice! You're rewarded for lighting fires

Scorching Earth is sort of like tic-tac-toe blended with chess—but different! Your goal is to burn the land on a level until you reach the score limit. Moving from square to square, you gain burn points by burning land, but you must also spend these same points spreading your fire. Weighing your options, you must work around obstacles while preventing your fire from burning out. http://tinyurl.com/5vw3y8





CIRCUS ARTS

Mr. Bounce

Keep your eye on the ball

Imagine the simple pleasure of bouncing a ball—then multiply that by about 100. Because in this digital bouncefest, your fun won't be hampered by space constraints, surface issues, or lost balls—except for those you fail to anticipate. Bounce your ball hither and yon to the game's body-thumping techno beat. Slow-motion and trajectory projection help you keep the ball in play, even as you face increasingly difficult bouncing challenges. http://tinyurl.com/6d5x2z

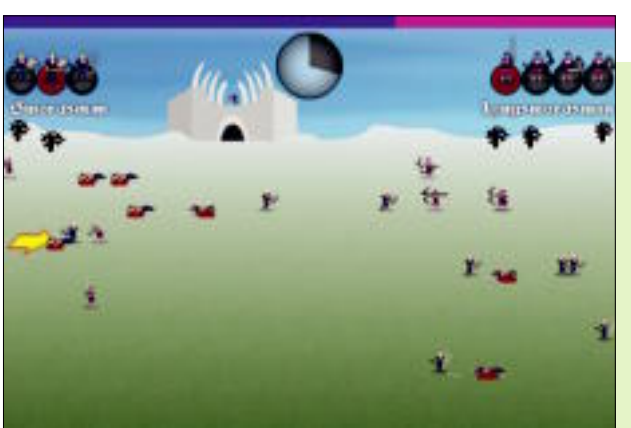
STRATEGY AND DEFENSE

Warlords: Call to Arms

Pop on your strat hat and pull down your try face, this game's no walk in the park

This game won't win any awards for graphics, but its mechanics and gameplay are rock solid. In this fast-paced strategy romp, your goal is to overrun the enemy with your army. The more units you push into their base, the closer you come to capturing the level. A surprising amount of tactical planning is required to know how and when to deploy your men; thankfully, there's an included strategy guide. The units are also well balanced, so no one character is constantly wreaking havoc.

It's also worth noting the game's exceptional sound. It's fully directional left to right, based on the location of each battle, and surprisingly crisp. Each unit also has a unique spawn sound. Playing through the campaign mode is quite fun and distinct for each race. We put this tactical time-waster at the top of our list. http://tinyurl.com/2v9kyx

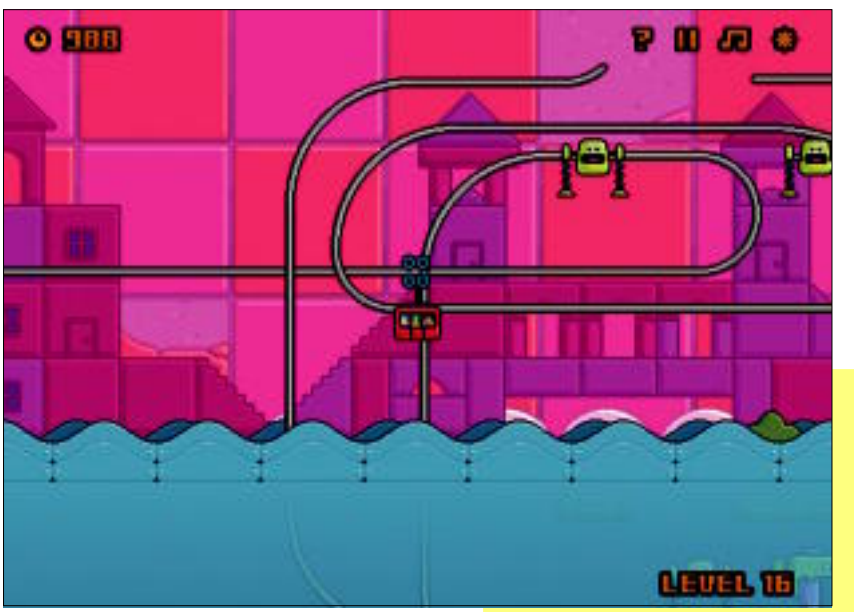


SKILL

Skywire 2

Do you have what it takes to be a chairlift operator?

Navigate your passengers to safety as you travel through treacherous terrain in your sporty, red three-seater chairlift. Robotic camels, spinning flamingos, and antsy parrots stand in your way as you furiously attempt to smash your Up and Down arrow keys at just the right moment to avoid these menacing obstacles. A safe passage will result in happy passengers, but run-ins with baddies will eject your human cargo from the lift. Can your fingers handle the challenge? http://tinyurl.com/59zoum



SHOOTER

Bowman 2

Bowman is back

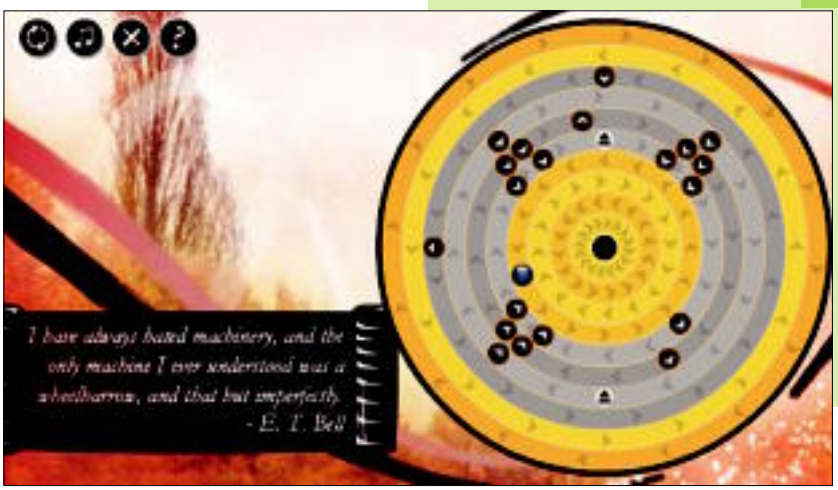
The original Bowman excited fans with its two-player turn-based archery combat—now it's back with even more features and fun. With the new Critical Hit setting and Bird Hunting mode, this just might be the perfect game for Dick Cheney. Challenge a buddy to a game of arrow-slinging or play against the computer and watch your opponent fall to your feet in bloody defeat. Calculate your shots carefully, as each turn may be your last! http://tinyurl.com/ygy2qz

PUZZLE

Twizzle

Twists and turns may make me churn, but Twizzle can never hurt me

A good sense of direction is needed to succeed in this mind-boggling brainteaser of a minigame. Navigate your way out of the center of a circle while multiple concentric tracks lead you in conflicting directions. New elements are introduced as you advance through 17 levels, and exploring the outcome of these obstacles is half the fun. What may start out as a seemingly simple task can turn into a hair-ripping, keyboard-smashing, mouse-jamming escapade—in other words, jolly good fun! http://tinyurl.com/6hkugn



ACTION

Age of War

Flash-based RTS? Hell yeah!

In this 2D RTS minigame, you build up your defenses and train units to push into the enemy's base. For every unit slaughtered you receive money and experience. After enough experience is gained, you can evolve, acquiring tougher and more powerful units. The constant need to balance between defense and offense makes this game fun for more than a few plays. http://tinyurl.com/2cbkcw

PUZZLE

Epsilon

Exploring the wonderful world of wormholes

Do other dimensions exist? Will a wormhole lead us there? This game won't exactly answer these questions, but it will make pondering the possibilities loads of fun. This flash-based mind exerciser can be seen as a parallel to the popular Valve game Portal. A portal-physics game, Epsilon thrusts you into the space-time continuum with the ability to stop and reverse time as well as manipulate gravity. Successfully arranging the wormholes will yield you tokens and entry into new and increasingly challenging levels. Think quickly, though, as one missed portal could leave your shiny orb stranded in a timeless abyss. Complex time fields, gravity tricks, and advanced mechanics will keep you on your toes. Play through the five different stages to reach the end and you just might discover something new. http://tinyurl.com/5rlo6y

ZOMBIE SHOOTER

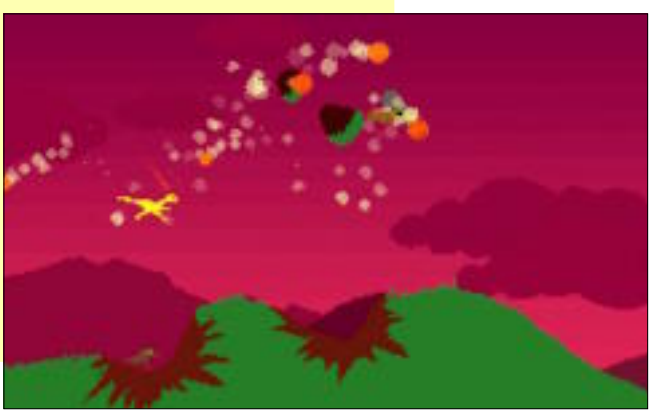
The Last Stand 2

Pump lead into a zombie onslaught... for survival of course

In this graphically detailed shooter, you scrounge for supplies during the day and mow down zombies at night. To search for supplies, survivors, and weaponry, you click various buildings from a sort of architectural blueprint of the town. Once the sun goes down, it's time to set up shop and slaughter the incoming hordes of infected creatures the good old-fashioned way—with guns and chain saws. http://tinyurl.com/5n75sc

SURVIVAL

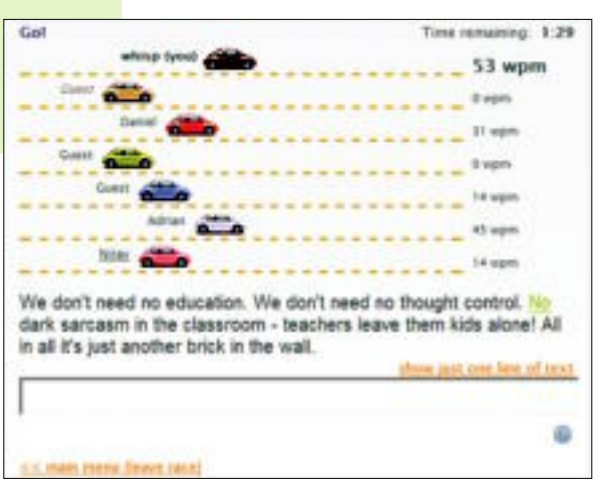
Dino Run



Escape extinction as you run from the end of the world!

You play as a puny dinosaur who's on the run from the end of the world. Dashing through each level, you have to gather eggs and bones that can later be used to upgrade your attributes. We love how Dino Run's pixelated graphics give this online game a unique look and feel. Don't be fooled though, while the old-school graphics make the game seem simple, it's harder than it looks and can get pretty competitive in multiplayer mode.

In multiplayer, you level up as you race. In doing so, you not only improve your character's abilities but also get to adorn Dino with new colors and hats. The game's extremely high replay value and quirky style are rivaled only by the amusement felt while leaping through the game's landscape. This is a flash game that can be picked up and enjoyed by even a novice online game player. www.pixeljam.com/dinorun


Go!
Time remaining: 1:29
53 wpm
We don't need no education. We don't need no thought control. No dark sarcasm in the classroom - teachers leave them kids alone! All in all it's just another brick in the wall.

RACING

Typeracer

Multiplayer Mavis Bacon

It's an unlikely premise, but in Typeracer, you race by, er, typing. Putting your fingers to the test, you'll compete against others in a word-per-minute sprint. You're given a notable passage from a film, book, or song. When the light turns green, your fingers better be flying, because the first person to finish without any errors wins. http://play.typeracer.com

WHITE PAPER

GDDR Memory

Tracking the ongoing evolution of graphics memory —MICHAEL BROWN

We invariably refer to the video memory in modern videocards as GDDR, differentiating it only by version (GDDR2, GDDR3, GDDR4, and now GDDR5), but the technology's full acronym is actually GDDR SDRAM, which stands for Graphics Double Data Rate Synchronous Dynamic Random Access Memory.

"Double data rate" describes the memory's capacity for double-pumping data: Transfers occur on both the rising and falling edges of the clock signal. This endows memory clocked at 800MHz with an effective data-transfer rate of 1.6GHz. "Synchronous" refers to the memory's ability to operate in time with the computer's system bus. This allows the memory to accept a new instruction without having to wait for a previous instruction to be processed, a practice known as instruction pipelining.

GDDR2 memory was never a very popular solution among GPU manufacturers: The technology required 2.5 volts to power its input buffers and core logic (i.e., VDD voltage), which is the same as GDDR. GDDR2 operated at much higher clock speeds than its predecessor, however, which produced a tremendous amount of heat. The fact that GDDR2's VDDQ voltage requirement (the electricity needed to power the memory's output buffers) was only 1.8 volts didn't compensate for this problem.

SURVIVAL OF THE FITTEST

GDDR3—an open standard developed by ATI in conjunction with the standards organization JEDEC Solid State Technology Association—is the most widely used graphics memory technology in use today. Ironically, Nvidia introduced the first graphics processors designed to use GDDR3: The GeForce FX 5700 Ultra, followed by the GeForce 6800 Ultra. ATI didn't deploy a GDDR3 solution until it shipped the Radeon X800.

GDDR3 improved on previous GDDR designs by supporting higher clock speeds while requiring less power. These chips consume less electricity, so they produce less heat and can rely on simpler cooling hardware (GDDR3's VDD and VDDQ voltage requirements are both 1.8 volts). GDDR3 also has separate read and write data strobes, which contributes to a much faster read-to-write ratio (meaning the turnaround from a read operation to a write operation occurs much more quickly) than GDDR2 supported. GDDR3 chips have a hardware reset feature that can wipe their memory clean to start receiving new data should such an operation be necessary.

ATI and Nvidia (in conjunction with JDEC) both had a hand in establishing the specification for the next generation of graphics memory, GDDR4, but Nvidia has so far decided not to use the new technology in any of its reference designs. ATI, meanwhile, incorporated the new memory first in its Radeon X1950 XTX cards and subsequently in several models of its Radeon HD 2000, 3000, and 4000 series.

GDDR5 PROMISES TO DELIVER TWICE THE MEMORY BANDWIDTH OF GDDR3 RUNNING AT THE SAME CLOCK FREQUENCY.

EVOLUTIONARY DEAD END

GDDR4's improvements over GDDR3 were mostly incremental. It seemed to offer a power advantage in that it could operate with just 1.5 volts, compared to GDDR3's 1.8 volts. Board designers, however, quickly discovered that they needed 1.8 volts anyway to ensure stability at higher clock rates.

Two other GDDR4 enhancements are

AT A GLANCE

GDDR Memory Features Compared

	GDDR3	GDDR4	GDDR5
DRAM Density	256Mb to 1Gb	512Mb	512Mb to 2Gb
Data Rate	1.0Gb/s to 2Gb/s	1.6Gb/s to 3.2Gb/s	3.6Gb/s to 6.0Gb/s
VDD/VDDQ Voltage	1.8v/1.8v	1.5v/1.5v or 1.8v/1.8v	1.5v /1.5v
Pre-Fetch Scheme	4 bit	8 bit	8 bit
Burst Length	4 or 8 bit	8 bit	8 bit
Real-World Memory Bandwidth Example	Nvidia GeForce GTX 280 (1GB frame buffer with a 512-bit memory interface): 142GB/s	AMD Radeon HD 3870 (512MB frame buffer with 256-bit interface): 72GB/s	AMD Radeon HD 4870 (512MB frame buffer with a 256-bit interface): 115GB/s

more significant in that they increase the memory's overall performance: The new memory doubled the size of GDDR3's prefetch scheme from 4 bits to 8 bits, and its burst length was locked at 8 bits (GDDR3 supports either 4- or 8-bit burst lengths). Prefetch enables the memory chip to anticipate the need for data and grab it before the GPU asks for it, reducing the time the processor has to wait. Burst length defines the amount of data sent in burst mode, a process in which data is transmitted without waiting for input from another device, such as the GPU. GDDR4's 8-bit burst length might be one reason Nvidia ultimately passed on this type of memory: Nvidia's processors support only 4-bit burst lengths. With ATI (now AMD) being the only major customer for GDDR4, just two manufacturers—Samsung and Hynix—decided to manufacture it. This circumstance has kept the price of the memory relatively high.

SUCCESSFUL MUTATION?

GDDR5 is the next major development in graphics, and as with GDDR4, AMD's ATI division has already paired it with its higher-end GPU: the Radeon HD 4870. Nvidia continues to hang back, professing satisfaction with the performance of GDDR3.

GDDR5 requires just 1.5 volts of electrical power, which should make the memory run cooler—a feature that could aid in overclocking, reduce manufacturing costs, and extend battery life if used in a notebook PC. The new memory's prefetch and burst length remain the same as that of GDDR4: 8 bits on both counts.

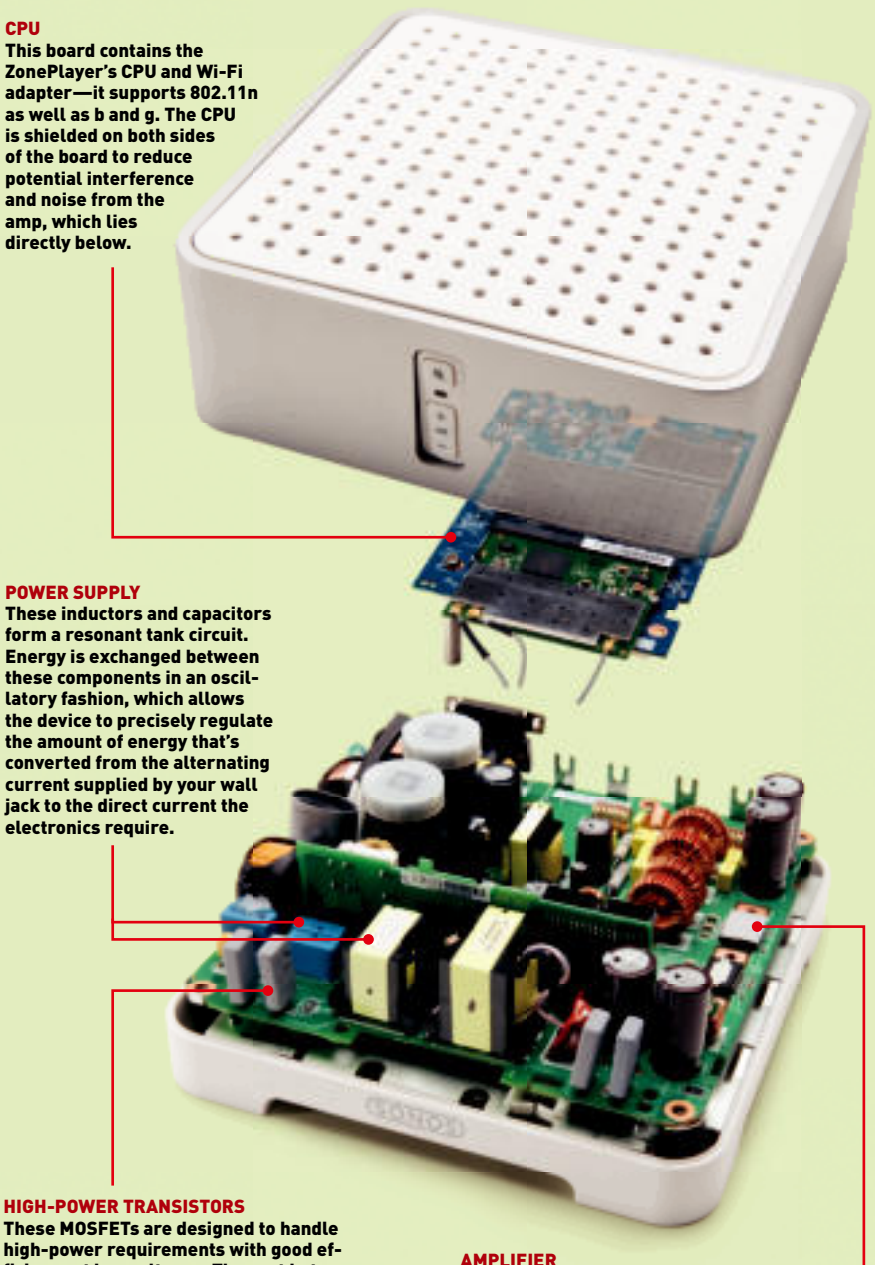
GDDR5 technology supports densities ranging from 512Mb to 2Gb, so it would require just four 2Gb modules to create a 1GB frame buffer (here again, however, real-world parts are currently limited to 512Mb and 1Gb). Boasting a raw theoretical data rate ranging from 3.6Gb/s to 6Gb/s (although we won't see that upper limit for several years), GDDR5 promises to deliver twice the memory bandwidth of GDDR3 running at the same clock frequency.

More practically, that high data rate also enables a GPU manufacturer to achieve nearly the same memory bandwidth with an economical 256-bit interface as it would by building a much more expensive 512-bit bus into its GPU.

Nvidia's professed ambivalence toward GDDR5 hasn't stopped a third major memory manufacturer—Qimonda—from joining Hynix and Samsung in the market for GDDR5 memory. Hmm, is anyone taking bets that Nvidia's next-generation GPU will tap GDDR5?

Sonos ZonePlayer ZP120

The newly updated streaming box adds 802.11n support to its original kick-ass chassis, but what else lies under the hood?



CPU
This board contains the ZonePlayer's CPU and Wi-Fi adapter—it supports 802.11n as well as b and g. The CPU is shielded on both sides of the board to reduce potential interference and noise from the amp, which lies directly below.

POWER SUPPLY
These inductors and capacitors form a resonant tank circuit. Energy is exchanged between these components in an oscillatory fashion, which allows the device to precisely regulate the amount of energy that's converted from the alternating current supplied by your wall jack to the direct current the electronics require.

HIGH-POWER TRANSISTORS
These MOSFETs are designed to handle high-power requirements with good efficiency at low voltages. They get hot, so Sonos clips them directly to the aluminum frame of the chassis for maximum passive cooling.

AMPLIFIER
These two modules power the left and right audio channels. They create a high-frequency waveform which is then low-pass filtered, which delivers smooth audio output at the speaker terminals.

SUBMIT YOUR IDEA Ever wonder what the inside of a power supply looks like? Don't take a chance on destroying your own rig; instead, let us do the dirty work. Tell us what we should crack open for a future autopsy by writing to comments@maximumpc.com.

HOW TO

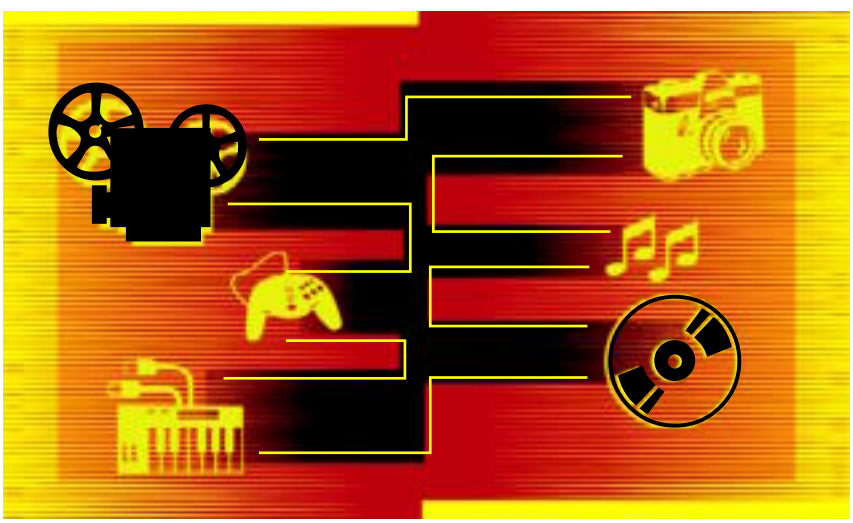
Build a NAS Box

Crush the performance of consumer network-attached storage devices by building your own! And you can use a number of legacy parts to do this on the cheap! —MICHAEL BROWN

TIME = 3 HOURS

WHAT YOU NEED

- **FreeNAS**
  Free, www.freenas.com
- **ISO RECORDER**
  Free, http://tinyurl.com/5p2m
- **USB THUMB DRIVE**
- **MOTHERBOARD**
- **CPU**
- **CASE**
- **MEMORY**
- **VIDEOCARD**
- **OPTICAL DRIVE**
- **VIDEOCARD**
- **POWER SUPPLY**
- **ONE OR MORE HARD DRIVES**



A network-attached storage (NAS) device is the Robin to a LAN's Batman. The two should be inseparable, and for good reason. A NAS box gives you a guaranteed way to store all of your files and stream your media. Running a NAS box also means that you don't have to boot your power-leeching desktop rig every time you want to access your files from another device.

But you don't have to go out and *purchase* a NAS device. You can build a superior alternative using spare parts left over after upgrading your PC.

We recently gathered a bunch of components that had been gathering dust in the Lab and built a FrankenNAS that absolutely pulverized its admittedly budget retail competitor, the $135 Linksys NAS200. Using an Asus A8N32 SLI Deluxe motherboard and a dual-core 2.6GHz AMD Athlon 64 FX-60 CPU, we were able to shorten our transfer speeds to one-sixth of the NAS200's on small transfers and around one-seventh on larger file moves. Note that you don't even need top-of-the-line hardware for your device. Our open-source operating system, FreeNAS, will run on almost anything.

But just because it's free doesn't mean it's simple. So we're going to walk you through the finer points of setting up a FreeNAS-based network storage device of your very own. You'll be streaming your favorite movies in no time!

SUBMIT YOUR IDEA Have a great idea for a How To project? Tell us about it by writing to comments@maximumpc.com.

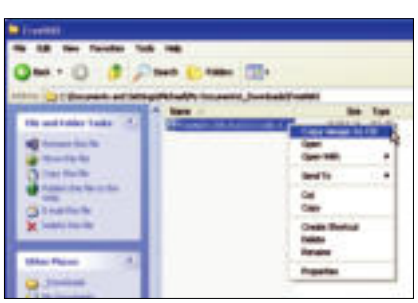
1 BURN THE FREENAS ISO TO CD

The first step in the process is building the physical NAS box, but since it's no different from assembling a PC, we're skipping ahead to the installation of the operating system. In order to do that, you'll first want to set your NAS motherboard's BIOS to boot from an optical drive.

FreeNAS is based on FreeBSD, a Unix-like open-source OS developed in the early 1990s. It's not Linux and it's definitely not Windows, so you should be aware that using the OS as the backbone of your file storage is going to first wipe out anything that might be on the hard drives you use. On the upside, FreeNAS itself requires no hard drive space for installation. It's so compact, we'll be using an embedded version that can run off a USB thumb drive or a CompactFlash card as small as 32MB.

Download the FreeNAS ISO and drop a CD in your burner. If you don't already have software capable of burning an ISO image to a CD, download and install the free utility ISO Recorder. If you're using ISO Recorder, right-click the file you just downloaded and choose the option "Copy image to CD."

Once you've burned the image, put the CD in your NAS box's optical drive, restart your computer, and boot FreeNAS from the CD. One caveat: Make sure your motherboard's BIOS is configured to boot from a USB device, as we'll be installing the operating system to a thumb drive.



2 INSTALL FREENAS ON A USB THUMB DRIVE

We're going to set up our NAS to boot from a USB thumb drive so we don't limit our upgrade options. If you didn't listen to us in the last step and are using an old mobo that just won't boot from a removable device, you have two options. You can boot from the CD and store your configuration file on a USB thumb drive or CompactFlash card or you can partition your hard drive, copy the OS to that partition, and boot from there. Be aware, however, that you cannot use the resulting storage partition for RAID: FreeNAS allows only whole drives in an array.

QUICK TIP

Double-check whether FreeNAS offers support for your hardware by checking the compatibility lists at http://tinyurl.com/36r4ue.

When the FreeNAS Console Setup menu appears (tap the Escape key if the FreeNAS splash screen doesn't disappear on its own), plug a thumb drive into the NAS box's USB port and choose the menu item "Install/Upgrade to a hard drive/flash device, etc." At the next prompt, choose the first option: "Install 'embedded' OS on HDD/Flash/USB." Choose the optical drive containing the FreeNAS ISO image and hit Enter. Next, select the USB thumb drive on which you want to install the OS. Note that the installation process's default choice is the hard drive, so make sure you've changed it to your thumb drive before you hit the Enter key.

After you've installed the operating system on the thumb drive, remove the CD and reboot your NAS box.

3 CONFIGURE YOUR NETWORK SETTINGS

When your NAS box has rebooted, choose item 1 from the Console Setup menu: Assign Interface. Unplug the NAS box's Ethernet cable and choose the OS's Auto Detection option. When prompted, plug the Ethernet cable back in and hit the Enter key. You should get a message that reads "Detected link-up on interface XX," where "XX" is the name of your Ethernet interface (in our example, the name was "nve0"). Hit the Enter key again.

The next screen will read "Configure OPT interface." This enables you to configure a second Ethernet port, assuming your motherboard has one. For now, choose the option that reads "Finish and exit configuration" and hit the Enter key. Accept the naming scheme presented in the next screen and hit Enter.

Next, type the number 7 and hit Enter to reboot the computer. When the machine has finished rebooting, choose item 2 from the Console Setup menu: Set LAN IP Address. The OS will ask if you want to use DHCP. Choose Yes unless your network is set up with static IP addresses. At the next prompt, select "AutoConfiguration for IPv6."

The OS will then give you the IP address that's been assigned to the NAS box. You can now ping your NAS box to verify that it has joined your network and you can manage its settings using your web browser. Just type the NAS box's IP address into your browser's address bar. The default user name is "admin" and the password is "freenas."

4 CONFIGURE YOUR DRIVE

Once you've logged into the web GUI, you'll want to take a whack at a few important configuration steps: Change the name of the NAS; set the correct date, time, and time zone; and create a unique username and password. Start by clicking General (in the left-hand menu stack, under the System heading) and change the desired information in the large pane on the right. Click the Password tab, type in the existing password ("freenas"), and enter your new password in the two boxes provided.

You're now ready to prepare your hard drive. Go back to the left-hand menu and choose Management under the Disks heading. The plus sign inside the circle on the right-hand pane indicates that you can add an element to the NAS. In this case, we're going to add a hard drive. Click the plus symbol and all the drives in your system (including the optical and USB thumb drive) will appear in the window next to the Disk heading. Be sure to choose your hard drive.

You might want to experiment with some of the options on this page (especially "hard disk standby time," "advanced power management," and "acoustic level"), but leave them at their default values for now. Do make sure that the value for "Preformatted file system" is set to "unformatted" before you click the Add button; then click Apply Changes.

5 FORMAT AND MOUNT THE HARD DRIVE

Ready to wipe your drive? Return to the Disks heading in the left-hand column of the NAS box's administrative options and click Format. Make sure you're ready to proceed, as the option will erase any information previously stored on the drive. Choose your hard drive from the drop-down menu, enter a volume label, and accept the remaining default choices: "File System: UFS (GPT and Soft Updates)," "Minimum Free Space (8)," and "Don't Erase MBR (unchecked)." Click the Format Disk button.

A drive must be mounted before it can be accessed, so go back to the left-hand Disks menu and click Mount Point. Click the circled plus sign, select Disk from the drop-down Type menu, and choose your hard drive from the drop-down Disk menu. Choose EFI GPT from the Partition menu and UFS for the File System value. Click the Add button when you're finished. An OK message in the Status window indicates that the drive was successfully mounted.

6 ENABLE SERVICES AND CREATE SHARES

We need to access our NAS box using computers running Windows, so it's essential that we enable the SAMBA networking protocol on our NAS box. Look in the left-hand column for the heading labeled Services and click the CIFS/SMB menu item. Place a check mark next to Enable in the main window but leave all the values at their default settings. Click the Save and Restart button.

Now that SAMBA's up and running, you'll need to create one or more network shares that allow your remote computers to treat the NAS box's hard drive(s) as though they're a local resource. Click the Shares tab in the "Services: CIFS/SMB: Settings" window and click the circled plus button. In the screen that appears next, give the share a name, add a comment describing the purpose of the share, set the path, and click the Add button. Click the Apply Changes button on the next screen.

When you've finished configuring FreeNAS, click the Backup/Restore button to create a backup of your configuration. You should now be able to find your NAS and your newly created shared folders listed in Windows XP's "My Network Places" (or Vista's "Network").

STREAM AWAY

How to Stream from Your NAS Box

Now that your new NAS box is ready to go, getting all your movies and photos to stream to your media device of choice is extraordinarily easy. Here's how you do it. Pull up your FreeNAS administrative options page and click UPnP under the Services menu. Click the Enable check box and assign a name to your device. Then select the NIC you'll be using. Add the directories you want to share and pick a component profile that best matches your UPnP device—like your Xbox 360, for instance. Click Save and Restart, and you'll be ready for some movie-watching!

This month the Doctor tackles...

Driver Updates
Missing Drive
Steam Troubles

The Hunt for Vista Drivers

Some time ago I purchased a Dell E1705 laptop with almost all the options. I was very happy with the laptop and its GeForce 7900 GS. It allowed me to play just about any game on the market. Everything was great until I upgraded my machine to Vista, but I can't find any Vista drivers for my 7900 GS.

I've been waiting for more than a year now, and there's still nothing from nVidia or Dell. So I was wondering: Do you know how I can get my card to work right? I would even take homemade drivers at this point if I knew where to find some!

—Chris Lingle

A solution to your predicament is quite simple. Go to Dell's website (www.dell.com) and click the Drivers & Downloads link. Next, choose the Inspiron E1705 from the provided list; you'll then be taken to the official downloads page for your laptop. Select your operating system and click the Video tab at the bottom of the screen. A list of drivers will pop up, including a December 2007 release of Nvidia drivers for GeForce Go 7800 and GeForce Go 7900 GS cards.

If you're running 64-bit Vista, the Doctor is sad to inform you that you're hosed. Dell doesn't have a driver for your card for that version of the OS. We recommend the following solution only as a last-ditch approach because following these instructions will void your card's warranty. That said, third parties will often create customized videocard drivers based off the latest Catalyst or Forceware releases. NGO (www.ngohq.com) is one of the more popular brands of customized drivers. At the site, you can download one of their driver packages. It'll come with support for both Vista 32-bit and Vista 64-bit, GeForce 2- to 8-series cards, and all GeForce Go cards. The Doctor still maintains that you're best off using the Dell-approved drivers—unless, you truly have no other alternative.

A Steamy Issue

I downloaded BioShock through Steam a couple weeks ago and have had trouble getting it to run. Sometimes it will randomly crash and send me back to the desktop with a message that tells me the display driver stopped working and has recovered successfully. I have to restart the program through Task Manager to get it to run again, but I can only play 5 to 10 minutes at a time. I have an Nvidia GeForce 8600M GT in a MacBook Pro running Vista 32-bit.

—Sean Thomas

Unfortunately, this is a problem that plagues a number of Steam users. Countless forum threads about this very issue are on the Steam troubleshooting boards.

The Doctor suspects that this error is related to the size of your operating system's paged pool memory (http://tinyurl.com/56frol). But users have reported varying degrees of success after applying the registry hotfix, so don't fret if this doesn't work for you.

See that error message? You won't for long. An issue with the Steam driver can send your videocard into a crashing loop until your rig finally blue screens.

As it stands, you're in for a round of troubleshooting. Valve itself has a number of potential fixes—try them at your leisure (http://tinyurl.com/6fzhqg). If none of them works, you can also try running BioShock in a window. It's not the best solution, but it has worked for the Doctor on occasion. You can also try adjusting your graphics settings in BioShock to the minimum. Installing different or newer versions of your Nvidia drivers is also an option.

The Doctor isn't avoiding your question. On the contrary, he'd love to have a permanent fix for the identical problems that plague his Steam games. And it is a Steam issue: The Doctor would bet a day's salary on the fact that if you installed and played BioShock using a CD, you'd be just fine.

Backing up My Game

My question regards backing up games using tools like ImgBurn and Daemon Tools. I use ImgBurn to create the ISO from a disk and Daemon Tools to mount the ISO. But for some reason, with half of my games I get the message "Please insert the original disk" when I try to run the game from the ISO. My method works with older games but not newer ones. I understand that some of these games might have some kind of protection on them preventing me from running them off an ISO, but I paid for these games and I should be able to create backups of them. Do you know how I can back up my games so they actually work?

—Sgt. Christopher Basquit

Your question opens up a bucket of worms, Christopher. The technical answer is easy: Developers include protection mecha-

nisms like SafeDisc and SecuROM on their game CDs to prevent consumers from making copies of the discs. The legal answer is trickier: Although you're well within your rights as a consumer to make archival or backup copies of your games for personal use, the Digital Millennium Copyright Act does not make allowances for bypassing copy protection to do so.

Given the nature of disc protection, the only way you can make a backup is to create an image of the CD with an application that allows for data positioning measurement. This replicates the various copy-protection technologies involved in the original disc's creation. From there, you have to use a disc emulation application to mount your image alongside a concealing application that hides this very act of disc mounting from the protection mechanisms. And that's where you break the law.

EVERYTHING WAS GREAT UNTIL I UPGRADED MY MACHINE TO VISTA.

Disappearing DVD

In your June 2008 issue, Frank Buttell mentioned a problem with a disappearing hard drive. I have also had that problem with Vista Ultimate, except my disappearing drive was my DVD +/- RW with LightScribe. I am dual-booting with XP Pro x64 edition and Vista Ultimate (32 bit). The drive is fine in XP, but in Vista, it will randomly disappear. A restart or sometimes a disconnect and reconnect of the SATA cable will solve the problem. So something must be up. What's going on?

—Joshua Parnell

You may be running into a problem that Microsoft resolved with a recent hotfix. The issue pertains to Windows Vista when Adaptive Host Controller Interface mode is enabled. Because you have a P35-based board, there's a good chance that AHCI mode with Vista is the culprit. Microsoft says the problem does not occur if the SATA support is set to "compatible." You can read more about the hotfix at http://tinyurl.com/6kumhj. The only catch is that you can't actually download the hotfix there. If you are having this problem, you must request the patch from Microsoft via a link at the top of the page.

SECOND OPINION

DVR Video over FireWire

I can't agree more with the Doctor regarding his advice to Michael Collins (June 2008) on a TiVo as the best option to extend your DVRing capabilities, especially for transferring recorded programs to a computer. The TiVoToGo feature is great. However, the Doctor's advice regarding the FireWire ports of most cable DVRs is, as Dwight Schrute would say, "False!"

As to Michael's question regarding legal issues, there are no implications. Just as the DVI and HDMI ports are protected with HDCP, the FireWire ports are protected with 5C DTCP encryption. Programs that are supposed to be copy protected are encrypted and cannot be captured with a computer, though the copy-protected content varies by market. One needs a D-VHS deck for authorized copying of such programs.

The FCC has mandated that cable DVRs must have the FireWire ports enabled. While many channels are encrypted, basic cable channels are not to be encrypted. If you find you can't capture a basic-tier channel (including local HDTV channels), call your cable company to complain; then lodge a complaint with your local cable franchise authority (usually listed on your monthly bill). –KEVIN ONKEN

SUBMIT YOUR QUESTION Are flames shooting out of the back of your rig? First, grab a fire extinguisher and douse the flames. Once the pyrotechnic display has fizzled, email the doctor at doctor@maximumpc.com for advice on how to solve your technological woes.

REVIEWS

Tested. Reviewed. Verdictized

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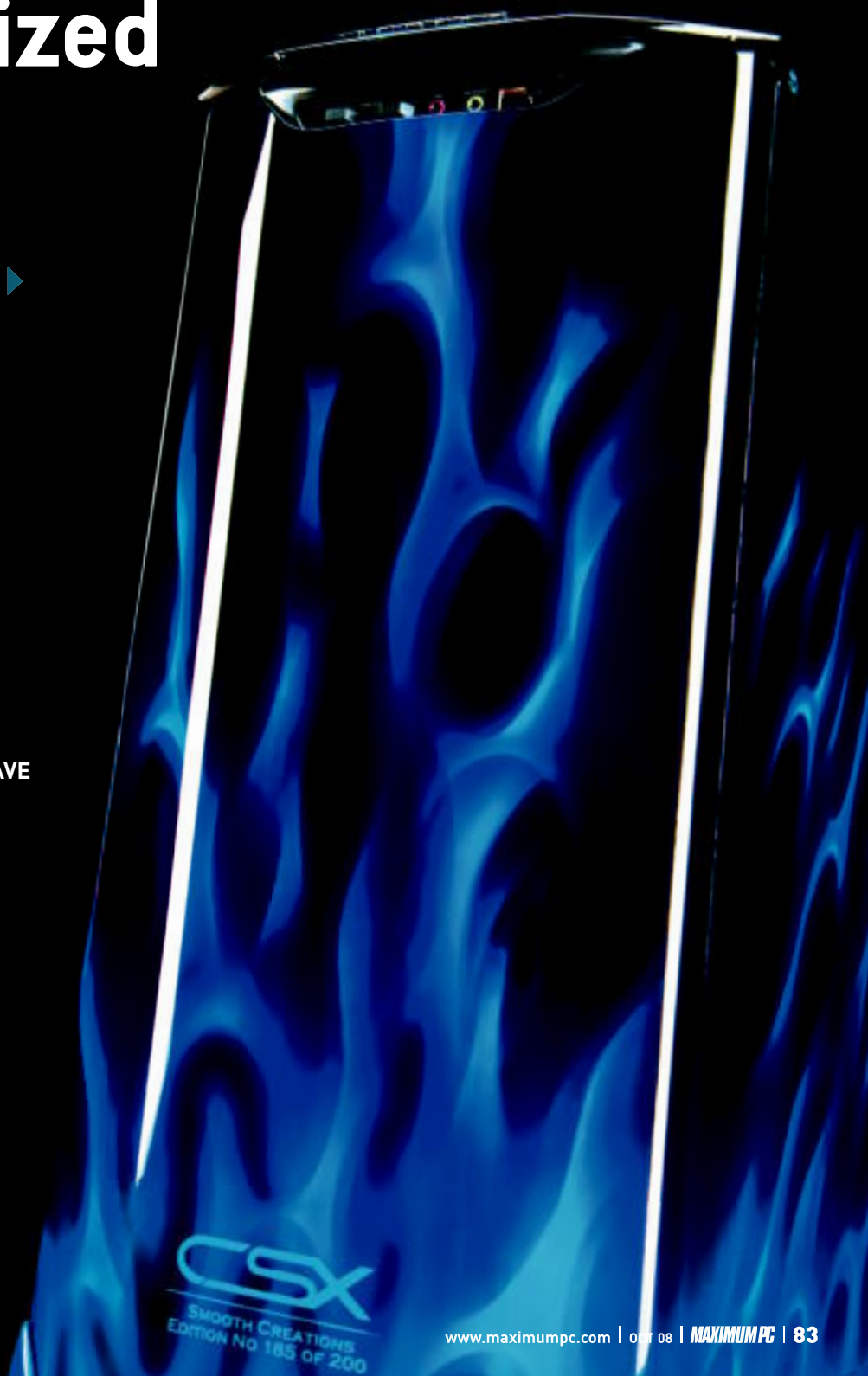


Gateway P-7811 FX

More than the sum of its parts

Gateway has the right formula for budget mobile gaming.

Gateway struck a nerve with its original low-cost FX P-series notebook, which gave gamers an affordable way to get good frame rates from a portable PC. The company applied the same formula to its new P-7811 FX and again comes up with a winning combination of hardware that's sure to please budget-minded gamers.

What's so great about this FX? First, there's Intel's new 2.26GHz Core 2 Duo Mobile P8400. This chip is similar to other 45nm mobile CPUs, but it runs on a 1,066MHz front-side bus on the new PM45 chipset, which supports DDR3. Gateway also stuffs 4GB of DDR3/1066 into the unit.

The notebook also features the new GeForce 9800M GTS, which is essentially a higher-clocked version of the GeForce 8800M GTS that offers 64 stream processors, a 512MB GDDR frame buffer, and a 256-bit memory interface.

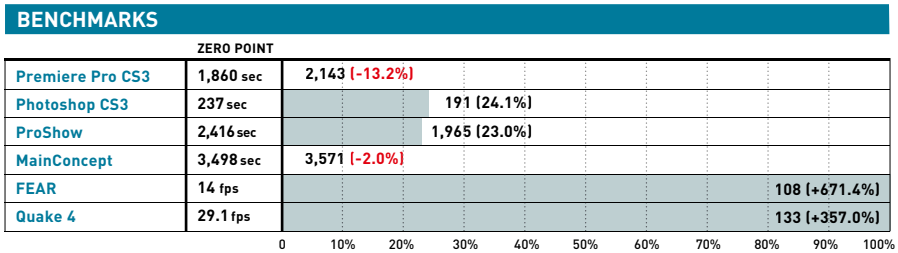
Of course, you can't stuff all this hardware into an ultraportable machine. With its 17-inch panel, the P-7811 FX weighs in at 9.2 pounds. That's a lot to schlep around, but other gaming notebooks, such as Dell's XPS M1730, weigh in at more than 10.5 pounds. The P-7811 FX is fairly thin, and if we had to carry it somewhere a few times a week it wouldn't kill us, but it certainly isn't a road warrior's rig.

The P-7811 FX's performance certainly doesn't disappoint. In nongaming applications, it compares well to notebooks that are far more expensive, including Apple's $2,500 MacBook Pro and Dell's $2,000 XPS M1530. In gaming, it destroys both those models, as well as all others featured in our August notebook showdown. We can't compare the P-7811 FX directly to the Alienware Area-51 m15x we reviewed in June because we've changed our benchmarks since then, but we believe the Area-51, with its faster GeForce 8800M GTX GPU and Core 2 Extreme X900 CPU, would best the P-7811 FX. On the other hand, the Gateway costs a fraction of the Area-51's price.

So what's the downside? For starters, the speakers. For a notebook this size, we expect booming audio—the P-7811 FX's output is just average. We're also not fans of the trick-or-treat color scheme, which strikes us as garish. And the DVD eject button is poorly placed. It's easy to accidentally press it while picking up the notebook. Finally, we have a problem with the power cord's right-angle plug. One of the most common failure points in a notebook PC is the port where the power plug is attached, and much more stress is generally put on a right-angle power plug due to its orientation. Just repositioning the plug torques the power port.

Still, there's a lot to like here. The original FX was a big hit, and this follow-up, with its HDMI and eSATA ports, great performance, and low price, is sure to follow suit. Who is this notebook for? Clearly not anyone concerned with mobility. As we noted, you don't want to carry this beast every day. But for a gamer who has limited space options, the FX is a hell of a notebook and a hell of a deal. **—GORDON MAH UNG**

BENCHMARKS



Our zero point notebook uses a 2.6GHz Core 2 Duo E6700, 2GB of DDR2/667 RAM, an 80GB hard drive, a GeForce Go 8600M, and Windows Vista Home Premium.

SPECIFICATIONS

CPU	Intel 2.26GHz Core 2 Duo Mobile P8400
RAM	4GB DDR3/1066
CHIPSET	Intel PM45
HARD DRIVE	200GB Seagate Momentus (7,200 rpm)
OPTICAL	TSST TS-L633P
GPU	GeForce 9800N GTS
BOOT/DOWN	74 sec/18 sec
LAP/CARRY	9.2 lbs /10.5 lbs

MAXIMUM PC KICK ASS!

VERDICT 9

GATEWAY P-7811 FX

+ THE SHIELD

Superb gaming performance for a superb price.

– NIP/TUCK

Too heavy to regularly lug around; mouse buttons feel creaky.

$1,400, www.gateway.com

Visiontek Radeon HD 4850

For less than $200 you can get a fairly competent DirectX 10 GPU

Last month, we spent a ton of time talking about the efficiency and overall pixel-pushing prowess of ATI's new GPU, so we won't waste much ink on the subject here. Suffice it to say, the 4850 delivers enough power to drive your sweet, new 22-inch monitor at its native resolution.

The card's silicon is equivalent to that of previous-gen high-end cards. It's equipped with 512MB of GDDR3 memory running at 993MHz. Unlike the Radeon HD 4870 boards (which cost $100 more), the 4850 doesn't sport GDDR5 (GDDR5 transfers twice as much data per clock cycle as GDDR3). The upshot? The HD 4850 has the slowest memory interface of any card in the current generation, and benchmarks show that—especially at high AA/anisotropic filtering levels.

The HD 4850 does sport the same GPU as the 4870, but it's clocked down to a modest 625MHz. Unlike the lesser Nvidia parts, which feature fewer stream processors, the 4850 includes a full complement of 800 stream processors paired with 40 texture units, just like the 4870. This means the HD 4850 is at its best in shader-heavy benchmarks such as Crysis.

At the $200 price point, this card's main competition is the old GeForce 8800 GT/9600 GT line of parts, against which it compares favorably. In benchmarks that are limited by shader performance, the 4850 absolutely slaughters the older GPUs. In memory-bandwidth-limited benchmarks, the older GPUs close the gap. While the benchmarks we list are primarily geared toward high-resolution screens, we also run some lower-resolution tests—Crysis on Very High chalked up a respectable 15.3 fps, on High it averaged 28 fps. Our image-quality tests didn't show any anomalies, and high-def video playback was flawless.

For anyone riding an old DirectX 9-era GPU, the HD 4850 is your ticket to full DirectX 10 capability—and a more than capable upgrade from your old card. For folks who already own a DirectX 10 card, there's really nothing to see here. –WILL SMITH

BENCHMARKS

	Radeon HD 4850	EVGA GeForce 8800 GT
3DMark Vantage Game 1 (fps)	**8.62**	6.0
3DMark Vantage Game 2 (fps)	**7.34**	5.69
Crysis (fps)	**11.9**	4.4
World in Conflict (fps)	11	**16**
3DMark06 Game 1 (fps)	**29.3**	25.2
3DMark06 Game 2 (fps)	**23.9**	23.3

Best scores are bolded. Benchmarks are run on our videocard test bed, which consists of a QX9800 CPU, an Intel X48-chipset motherboard, and 4GB of DDR3 memory. All tests run at 1920x1200 with 4x AA and 16x anisotropic filtering enabled. Crysis is run at Very High settings.

VERDICT 7

VISIONTEK RADEON HD 4850

+ DR. HORRIBLE	– BAD HORSE
Cheap-and-easy DirectX 10. Single slot. Supports HDMI, HDCP, and accelerated Blu-ray playback.	Not that much faster than an 8800 GT. Conks out at high resolutions, AA/anisotropic filtering levels.

$200, www.visiontek.com

Visiontek's Radeon HD 4850 delivers entry-level DirectX 10 performance at a compelling price.

iBuypower Gamer Paladin 990

GeForce GTX 260s disappoint in this unusual budget-performance hybrid

IBuypower should have spent less on the Paladin's paint job and more on its GPUs.

IBuypower's Gamer Paladin 990 is a strange beast. After we completed our testing, we were left wondering just what iBuypower was trying to accomplish with its half exotic, half midrange rig.

Take, for example, the videocard situation. The machine sports a pair of Nvidia's newest GPUs, but not the company's top-end offering, the GeForce GTX 280. Instead, iBuypower uses a pair of EVGA GeForce GTX 260s. If these GeForce cards weren't midrange when they were first released, they certainly are now, as Nvidia has taken a blowtorch to prices to keep the GTX 260 competitive with ATI's Radeon HD 4870.

But just when you think, OK, this is a midrange machine, you're confronted with two exotic additions: an overclocked, super-expensive 3.2GHz Core 2 Extreme QX9770 and a limited-edition Cooler Master CM830 case that's been painted by Smooth Creations.

Smooth is arguably the best case paint shop in the business, dating back to the days when it decorated Falcon Northwest's machines. Let's just say that this rig's paint job is nicer than our car's. We're also sweet on the EVGA 790i SLI Ultra board and its 4GB of DDR3 Corsair RAM. OK, so now you're thinking this is actually an exotic PC, right? Well, no, not when you get to the storage. The machine sports a single Western Digital 150GB Raptor and a terabyte drive to back it up—and it's not WD's latest and greatest, lust-worthy Velociraptor.

We just don't get it. It's simply a crime to configure a Raptor without including a second Raptor in RAID 0. We'd rather have two terabyte drives than this funky setup.

On the performance front, the machine posts some solid benchmark numbers. IBuypower overclocked the stock 3.2GHz QX9770 to a very conservative 3.8GHz, which gets you pretty good performance and incredible stability. We subjected the machine to several hours of stress testing without a crash. In our non-gaming tests, the 3.8GHz Penryn CPU destroyed our zero-point's 2.67GHz Core 2 Quad Q6700 but didn't set any records. Most of our benchmark records are held by CyberPower's Gamer Ultimate SLI Quad (reviewed July 2008), which was overclocked to 4GHz and featured a pair of Raptors in RAID 0. The Paladin 990 trailed the $5,000 Gamer Ultimate SLI Quad in every category. The sad part is that the Paladin's pair of GeForce GTX 260 cards couldn't outrun the Gamer Ultimate's pair of GeForce 9800 GX2s in SLI. The older GPUs in the Gamer Ultimate were significantly faster in Crysis and Unreal Tournament 3, so maybe there's a reason Nvidia had to slash the price of the GTX 260 cards.

Here's the real problem though. We're not averse to dropping big sums on a rig—but it has to be worth it. At $4,600, the Paladin is hard to justify. Sure, it blazes past our zero-point, but we've tested machines that are even faster and not much more expensive than the Paladin.

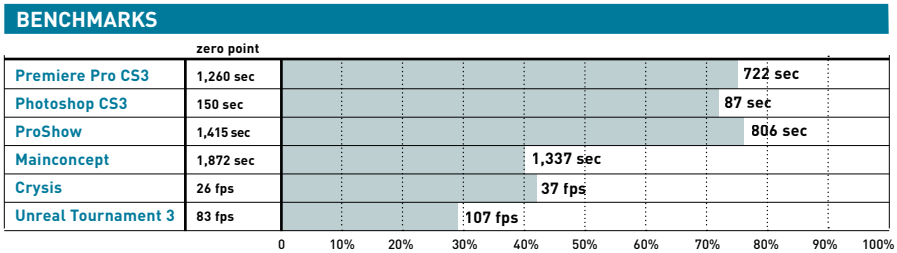
Still, you get a sweet paint job and a pretty nice machine, but our take is that if you're willing to spend $4,700, you might as well drop a few more bucks to get a faster rig.

—GORDON MAH UNG

SPECIFICATIONS

PROCESSOR	Intel Core 2 Extreme QX9770 (3.2GHz@3.8GHz)
MOBO	EVGA nForce 790i SLI Ultra
RAM	4GB Corsair Dominator DDR3/1333
VIDEOCARD	Two EVGA GeForce GTX 260 in SLI
SOUNDCARD	Onboard
STORAGE	One WD Raptor 150GB, one Seagate 1TB
OPTICAL	Sony Optiarc BR-5100S
CASE/PSU	Cooler Master CM830 / Thermaltake ToughPower 1000

BENCHMARKS



Our current desktop test bed consists of a quad-core 2.66GHz Intel Core 2 Quad Q6700, 2GB of Corsair DDR2/800 RAM on an EVGA 680 SLI motherboard, two EVGA GeForce 8800 GTX cards in SLI mode, a Western Digital 150GB Raptor and 500GB Caviar hard drives, an LG GGC-H20L optical drive, a Sound Blaster X-Fi soundcard, a PC Power and Cooling Silencer 750 Quad PSU, and Windows Vista Home Premium 64 bit.

VERDICT 7

IBUYPOWER GAMER PALADIN 990

+ OZZIE SMITH	− ADAM SMITH
Smooth Creations's paint jobs continue to be the best in the business.	GeForce GTX 260 cards have no place in a high-end PC.

$4,600, www.ibuypower.com

Gigabyte GA-EP45-DQ6

Generous offerings make this P45 board unique

If you don't just like Gigabit ports—you love them— Gigabyte's GA-EP45-DQ6 is the motherboard for you. This mobo has four Gigabit ports that can be teamed together for one seriously fat-ass network connection.

Elsewhere, the board is typical Gigabyte; it includes surface-mounted buttons and the most clearly marked USB and FireWire ports we've ever seen. So if you nuke your USB drive because you plugged the USB connector into a FireWire header, it's your own fault, brother.

The board, of course, is based on Intel's new P45 chipset and sports two physical x16 PCI-E 2.0 slots. One runs at x16, the other at x8. Intel's P45 doesn't officially support 1,600MHz front-side bus speeds, but Gigabyte says the board will hit 1,600 without any issues. Since the GA-EP45-DQ6 is more of a midrange board, Gigabyte went with DDR2 instead of DDR3, which is understandable. Although it's getting more affordable, DDR3 is still expensive if you want modules that will hit overclocked speeds of 1,600MHz or 1,800MHz.

We found no major layout gaffes with the board, and, in fact, favor the GA-EP45-DQ6's design over that of the MSI P45 Platinum we reviewed in September. While the P45 Platinum gives you just two x1 slots, Gigabyte hands you two x4 slots and an x1 PCI-E, as well as the standard dual x16 slots.

The GA-EP45-DQ6 did lag behind the MSI P45 Platinum in several benchmarks. Some consumers will be troubled by this, but these performance hiccups are to be expected early in a motherboard's release, and BIOS updates usually solve them.

So what's not to like? The GA-EP45-DQ6 is a bit pricey for a P45 board—about $70 more than the faster, but not as well spec'd, P45 Platinum. And its price is within striking distance of X48-based boards, which are superior for CrossFire applications.

Still, if Gigabyte can correct the performance kinks, this is a pretty nice board for someone who isn't running multi-GPU applications and, of course, just loves Gigabit ports. –GORDON MAH UNG

BENCHMARKS

	Gigabyte P45 GA-Ep45-DQ6	MSI P45 Platinum
PCMark Overall	8,402	**8,756**
PCMark RAM	**5,800**	5,737
3DMark06 Overall	12,440	**12,735**
ScienceMark 2.0 Overall	1,564	**1,566**
ScienceMark 2.0 Mem	6,980	**7,112**
Valve Particle Test	87	**88**
UT3 (fps)	107	**117**
FEAR (fps)	210	**245**
Quake 4 (fps)	**179**	177

Best scores are bolded. Our test bed consists of a Core 2 Quad Q9300, 2GB of DDR2/1066 RAM, a GeForce 8800 GTX, and Windows XP Pro SP2.

VERDICT **8**

GIGABYTE GA-EP45-DQ6

+ MARTIN SHEEN	– CHARLIE SHEEN
Healthy dose of PCI-E slots and well-labeled USB and FireWire headers.	Performance lags behind other P45-based motherboards.

$260, www.gigabyte.com.tw

Although it lagged behind in a few benchmarks, this is one of the nicest P45 boards we've tested.

Toshiba 320GB Portable Drive

A solid, albeit undistinguished, storage solution

Toshiba's 320GB portable drive is so plain it doesn't even have a real name. It's just the Toshiba 320GB USB 2.0 Portable External Hard Drive, which doesn't quite roll off the tongue as well as Western Digital's My Passport Elite, the Toshiba 320's primary competition in terms of size, speed, and software (see our review of the Elite at http://tinyurl.com/3emu9z).

The USB-only Toshiba 320 posted the slowest real-world read speeds of any drive we've tested. However, these lapses represent only a four percent difference in real-world performance when compared to the fastest non-proprietary drive we've tested, Western Digital's My Passport Elite. Four percent is four percent, but it's not enough to make a significant difference.

Fortunately, the Toshiba 320's poor read speeds were ameliorated by quick write speeds—the second-fastest we've seen from our write benchmark. It's a great accomplishment considering that the write-speed victor, Buffalo's DriveStation Combo 4 (reviewed September 2008), uses a proprietary TurboUSB utility to squeak even more speed out of its connection.

Portable USB storage devices tend to post similar read and write speeds in our benchmark tests, so we use the drives' included software as a way to further distinguish between them. We dinged the My Passport Elite for offering too many redundant software options, including no less than three backup and synchronization programs. Toshiba's drive solves this issue by including only two programs.

NTI Shadow 3 is a simple application for backing up your files. It comes with both synchronization and scheduled-backup options. That's it. The other piece of software, NTI Ripper, attempts to fill a void that iTunes already filled long ago. Turning CD tracks into digital audio files lost its complexity five years ago—and that's being generous.

As a drive, the Toshiba 320 is competitive. As a backup solution, it ignores some of the more exciting possibilities in the storage space, such as file encryption. Somewhere between the software-bloated My Passport Elite and stripped down Toshiba 320 lies the perfect backup/storage device. We'll keep searching for it. **–DAVID MURPHY**

BENCHMARKS

	Toshiba 320GB	WD My Passport Elite	Buffalo DriveStation Combo 4 (TurboUSB)
HD Tach Burst (MB/s)	35.2	**36.2**	WNR
HD Tach Rdm. Access (ms)	17.8	17.0	**16.4**
HD Tach Avg. Read (MB/s)	31.7	33.9	**41.7**
HD Tach Avg. Write (MB/s)	34.3	32.0	**41.1**
PCMark05 Overall	3,161	3,288	**3,833**

Best scores are bolded. HD Tach version 3.0.1.0 used.

VERDICT 7

TOSHIBA 320GB PORTABLE DRIVE

+ AMOEBA	– SUBPOENA
Fast write speeds; easy-to-use backup software.	Slow read speeds; lacks an encryption program.

$180, www.toshiba.com

Toshiba's middle-of-the-road drive would benefit from additional backup and synchronization features.

Gigabyte Poseidon 310

Raise a trident in honor of this chassis

Instead of a god of the sea, Gigabyte's midtower Poseidon 310 chassis is a petite prince. But that's merely a reflection of this case's size, not its prowess. It clocks in at 7.75"x17"x20"—small enough to fit into that nook in your desk or the space under your bed.

Even given its small size, the Poseidon supports up to five 5.25-inch devices. We're unsure why this case—or any case, for that matter—still bothers with multiple external 3.5-inch bays. You get two helpings of them on the Poseidon. We would have rather sacrificed these and an additional 5.25-inch bay in favor of more internal hard drive space. Though we're not complaining about what we get for internal storage: three hard drive bays with included rails.

The Poseidon's tool-free approach elevates this case above those that attempt to save on production costs by using screws. All of the rig's key parts can be modified in a very short amount of time. Want to install a new optical drive? Pop off the front grill, slide it in, and use Gigabyte's locking mechanism to secure it in place. Need to replace your videocard? Don't reach for the screwdriver. Just unhook the locking tab, swap the cards, and secure the new one in place. The fact that we never had to remove both side panels to modify our rig's insides makes us squeal with glee.

VERDICT 8

GIGABYTE POSEIDON 310

+ TITAN QUEST	– KID ICARUS
Almost completely tool-free; hard-drive-bay cooling; rubberized water-cooling holes.	Slightly cramped on the inside; no cable management options; few front-panel connections.

$100, www.gigabyte.com.tw

We also appreciate the Poseidon's two blue 12cm fans. One pushes air over the drives, the other whisks it out of the case's rear. Additionally, the case's grilled side panel diffuses the fans' light into a pleasant glow, but depending on your vantage point, this panel can actually obscure the case's inner light completely.

The Poseidon 310 does suffer from a few imperfections. The front-panel support is a touch anemic with two USB ports and one FireWire 400 connector. The case's smaller size becomes apparent when you try to stuff a larger videocard into its bowels. An 8800 GTX–size monster will fit, but you aren't left with much room for cables on the card's sides. A lack of motherboard tray cable-management holes exacerbates the issue.

As a whole, the Poseidon 310 is a fine chassis. Only a few missteps keep it from ascending to the Mount Olympus of cases, but we wouldn't scoff at a lesser god.

—DAVID MURPHY

The LED fan on the Poseidon lends the case's interior a subtle blue glow that's further softened by the case's grilled side panel.

Zalman CNPS9300 AT

Big power in a tiny package

We did not expect *this*. When we first got our hands on Zalman's CNPS9300 AT, we assumed the company had pulled a "Honey, I Shrunk the CPU Cooler" on its flagship product, the bulky CNPS9700. That's certainly true if you consider the tale of the tape: The CNPS9300 is 80 percent smaller than its big brother, and its total thermal dissipation area has been nearly halved, from 5,490cm² to 2,583cm².

Logic only dictates that this cooler should perform far worse than the Zalman CNPS9700. But the built-for-silence CNPS9300 AT nearly matches its big brother's performance—as well as that of our top cooler, Thermaltake's DuOrb (reviewed July 2008).

Since it eschews the CNPS9700's fan controller in favor of a four-pin motherboard connection, the CNPS9300 AT's fan can be controlled through the BIOS or by using a utility such as SpeedFan. We welcome the change, as it's much easier to adjust the cooler via a software application than by opening your case and turning a knob.

Cranking the CNPS9300 to full throttle elicits a loud whirr, but it allows the device to match the quieter DuOrb degree for degree. Letting the BIOS automatically decide the fan's speed drops the device's cooling power by about five degrees; however, it is much quieter when set on auto mode.

The CNPS9300 still relies on a tiresome and frustrating installation mechanism. The backplane requires motherboard removal, perhaps the least irritating part of the process. The cooler's mounting bracket barely fits atop the voltage regulators of our EVGA 680i motherboard. And the amount of force we applied to the screws on the CNPS9300's retention bar to affix it to the mounting bracket had us seriously concerned about the welfare of our processor.

Because of the CNPS9300's installation shortcomings, the DuOrb remains our reigning cooler of choice, despite its gargantuan size. We love the performance Zalman has achieved with its mini-cooler. Attaching it to our CPU is where we start to sweat. –DAVID MURPHY

BENCHMARKS

	CNPS9300 AT (Smartfan)	CNPS9300 AT (100%)	Thermaltake DuOrb	Stock Cooler
Idle (C)	39.5	**32.5**	35.0	46.0
100% Burn (C)	56.0	51.5	**51.0**	70.0

Best scores are bolded. Idle temperatures were measured after an hour of inactivity; load temperatures were measured after an hour's worth of CPU Burn-In (four instances). Test system consists of a stock-clock Q6700 processor on an EVGA 680i motherboard.

VERDICT 8

ZALMAN CNPS9300 AT

+ V	– HELLBOY
Amazing performance for its size; fan adjustable through the BIOS.	The installation process needs to be simplified.

$50, www.zalmanusa.com

Zalman is keeping the current black-fan version of the CNPS9300 for now but hasn't ruled out making an LED-fan version that matches the CNPS9700's look.

Polaroid PoGo

Shaking it doesn't make the print develop any faster

If you still get warm and fuzzy thinking about those James Garner and Mariette Hartley Polaroid commercials, it's time to let go of the past. Traditional film is barely hanging on, and Polaroid has completely ceased production of instant film.

But Polaroid hasn't abandoned its interest in prints. The company is trying to rekindle the instant-print picture industry with its new Polaroid PoGo portable printer. This 4.75"x2.75"x1" device is the first to use Zink Imaging's Zero Ink paper. Instead of shooting dots of ink onto a piece of paper, the PoGo uses a thermal head to heat up tiny crystals embedded in each sheet of paper. Polaroid says standard dpi rules don't apply, but the resolution is comparable to 300 dpi and each sheet has about 100 billion crystals in it. Each pic will cost about 33 cents to print.

The PoGo holds 10 2"x3" borderless sheets of paper. On a full charge, you can get up to 20 prints out of it, if you're lucky—not enough, in our book. It doesn't help the PoGo that its power brick is about the same size as the printer itself.

When we connected our camera via the PoGo's USB type A port, the printer cranked out a photo in 30 seconds. You can also hook up your Bluetooth-enabled camera phone to print pictures. Or maybe not. Three of our phones failed to print via Bluetooth. After browsing Polaroid's list of approved phones, we came to the conclusion that you have a 50 percent chance of printing from your handset. It's not Polaroid's fault, though: Bluetooth is one of the most botched technology rollouts in history, but Polaroid will certainly get the blame.

That's unfortunate because there's a lot to be said for the PoGo's fun factor. Each print has a light adhesive backing, so you can stick your prints anywhere. Image quality is average, but the PoGo isn't about creating crystal clear photos. It's about the instantaneous fun of being able to give a picture to someone right after you snap it.

The PoGo is definitely a generation 1.0 product, and as such, we recommend it only for someone willing to overlook its numerous flaws in image quality, battery life, and Bluetooth connectivity. We do, however, look forward to the second-generation PoGo. —GORDON MAH UNG

VERDICT 6

POLAROID POGO

+ KNUCKLEBALL	− KNUCKLE SANDWICH
Fun and truly mobile printer that you can actually take with you.	Power brick is huge; battery life must be improved.

$150, www.polaroid.com

Fun yet flawed, the PoGo tries to recapture the fun of a Polaroid.

American McGee's Grimm

Paint the fairy tale world black with grime

Remember those happy-ending fairy tales your mother used to tell you? Well, your mama was feeding you sugar-coated rehashes of the original morbid tales. Grimm, the mischievous protagonist of this episodic platform game, wants to set the record straight—and he's using his soot-spreading powers to do it.

To begin each episode, Grimm narrates a puppet show version of a fairy tale as it has traditionally been told. The snarky commentary grants these sequences undeniable charm, which is further enhanced by the simple character models and animation. The pastel colors and blocky figures make the game look like a storybook illustration come to life.

As Grimm, you'll plunge a bright, carefree world into darkness.

Next, we set foot in the game world to wander as Grimm and spread darkness through the lands. Running around the level automatically changes the surrounding environment from light to dark. We turned playgrounds into graveyards and bright forests into nightmarish death traps, progressing Grimm's Dark-o-Meter until we reached a certain goal. The more darkness we spread, the more influence our avatar had over the environment.

The gameplay does get repetitive, however—we did nothing more complicated than a combo of timed platform jumps. By the end of each episode, we were tired of running around without facing any real challenge, although the varied locales (such as the wolf's stomach from "Little Red Riding Hood") kept the game interesting. The minimal gameplay demands are better suited for younger players, but the game is rated M, and the dead children and liberal use of blood are clearly inappropriate for youngsters.

Episodes of Grimm are free on the day they are released on GameTap. If you have half an hour to spare, the puppet-show segments alone are worth the download. —NORMAN CHAN

VERDICT 7

AMERICAN MCGEE'S GRIMM

+ ENCHANTED	− EVER AFTER
Humorous voice-acting; creative art style; just the right length.	Simple, repetitive action; gameplay unchallenging.

Free on release day (pricing TBA), www.gametap.com ESRB: M

LAB NOTES

The Peculiarity of Panels

It's time for LCD monitor manufacturers to tell you what they're selling

DAVID MURPHY
ASSOCIATE EDITOR

LCD monitors come in all shapes and sizes. And as you've read in this month's monitor feature (page 42), even the types of TFT panels found in modern consumer displays vary, the most common types being TN, S-PVA, and S-IPS. Each one has it pros and cons.

The trouble is, manufacturers abhor mentioning panel types on their specification lists. While this might not discourage an in-store shopper who can judge a screen's attributes first-hand, online shoppers are out of luck. That needs to change.

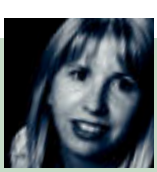
The unique differences between the panel types are important and distinguishing characteristics for your purchasing decision. Transparency would also prevent manufacturers from pulling a bait and switch with a product's panel type (as when Dell moved from S-IPS panels to S-PVA midway through the 2407WFP's life). With all the marketing drivel that surrounds display technology, the least monitor makers could do is tell you exactly what kind of panel you're staring at.

WILL SMITH
EDITOR-IN-CHIEF

Ah, the workaday world of a magazine editor. This month, I spent a ton of time separating fact from fiction when it comes to Microsoft Vista. It turns out many of the operating system's flaws have been fixed! I also did a guest turn at Amazon's PC store, helping them configure a kick-ass $1,500 PC.

NORMAN CHAN
ONLINE EDITOR

Hewlett-Packard's Voodoo Envy 133 is such a sexy notebook I literally licked it. But I don't feel the least bit ashamed of my behavior—this carbon-fiber ultra-mobile PC is so yummy that it even contains the sweet taste of desire. Also, carbon fiber.

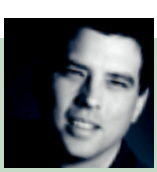


KATHERINE STEVENSON
DEPUTY EDITOR

After both the notebook and desktop PC I use at home lost Internet access following a Windows Update conflict with Zone Alarm, I started wondering why I even use ZA. Over the years, I've become so desensitized to its permission popups that I just automatically hit "Allow"—kind of like the Vista UAC issue.

GORDON MAH UNG
SENIOR EDITOR

With PCI-E soundcards now available, I'll finally be able to dump the onboard audio in my main home rig. I've been cardless since running out of PCI slots (a RAM drive, PATA adapter, and double-slot GPU left nothing) and thus suffering random audio anomalies and substandard sound in games.



TOM EDWARDS
MANAGING EDITOR

This month, I worked with Gordon to benchmark the iBuyPower Gamer Paladin 990 (see page 87). While it's a pretty solid machine, I was a bit perplexed by the company's decision to spend big bucks on the rig's custom paint job but include GTX 260s cards rather than GTX 280s.

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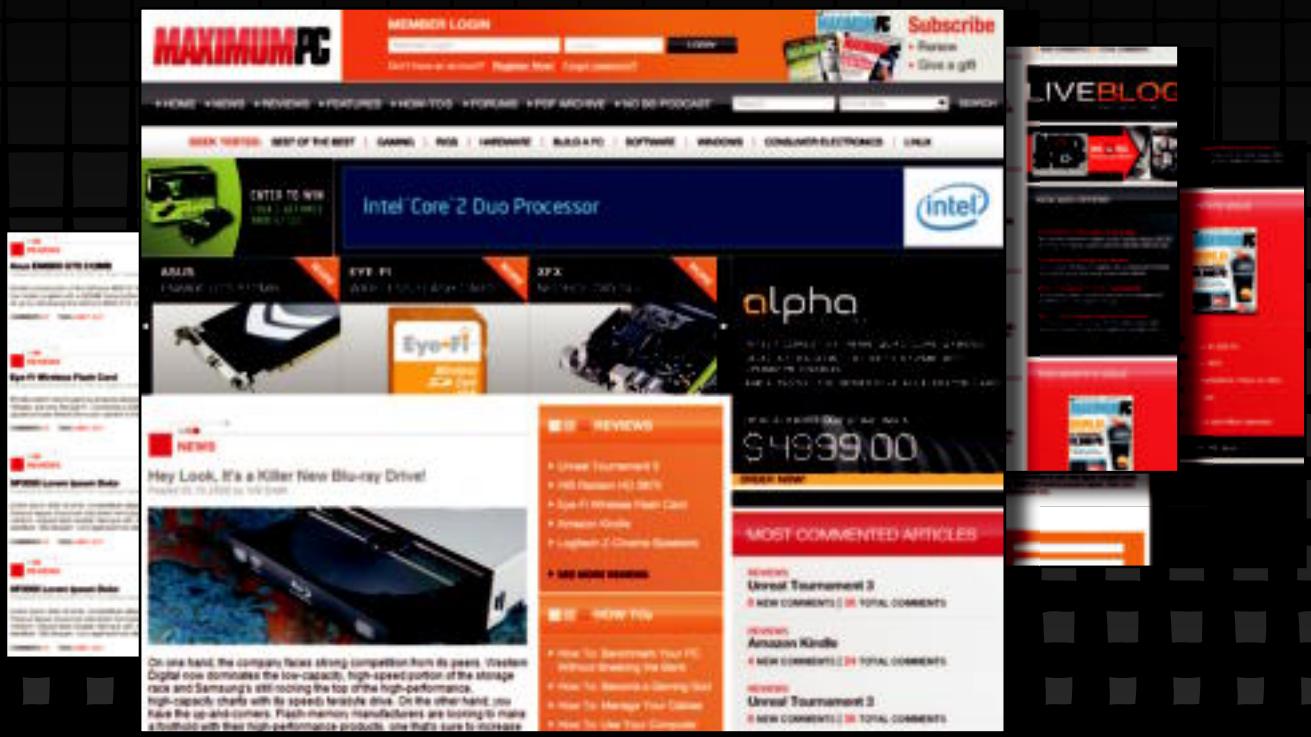

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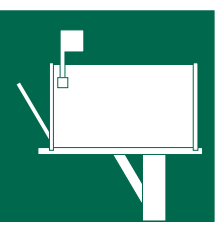

It's What's Inside that Counts

I have here in my hot little hands the August 2008 issue and was reading through the PC notebooks vs. MacBooks article when I spotted what could be an error. In the MacBook Pro review, you say there's no way to add a cellular modem to the notebook, and no factory option for it. I don't know about the factory option, but it's entirely possible to add a cell modem to the notebook (if you mean what I think you mean). There are several USB cell modems on the market that work with both Windows and Mac, and I know of at least one Express/34 modem from Sierra Wireless that is compatible.

—Robert Fox

Senior Editor Gordon Mah Ung Responds: The context of the statement was that you cannot add an internal broadband modem. I think it's pretty clear that you can add a USB modem or ExpressCard modem, but, for many people, that's just funky, especially when you're talking about those dorky-looking USB-modem appendages.

So Say Most of Us

I realize that printing costs are going up and readership of printed periodicals is on the decline. That is no excuse, however, for making statements like the one in "The List: 10 Things That Are Wildly Overhyped!" (July 2008). How can you say, "*Battlestar Galactica*: Once-awesome sci-fi is now *Melrose Place* in space," without any supporting evidence? Was this an intentional "grenade toss" to see how many emails you'd get about it?

I noticed that there is no author listed for The List. Is this because everybody contributed or because whoever wrote it is a troll who knew he would be flamed for such ridiculous comments? At any rate, I'm curious to know the thought process that defends such a wild-ass statement.

Until the former Mrs. Richie Sambora makes an appearance on the show, I refuse to believe there is any merit to the metaphor, other than that they are both TV shows with a loyal fan base. Convince me otherwise.

—Jamie Beu

Editor in Chief Will Smith Responds: *Warning, this response contains plot spoilers.* To tell you the truth, Jamie, yours was the only email we received refuting our claims. And although the facts pain me, you have to admit I'm right. Sure, there are moments of

CUTCOPYPASTE

In our August issue, we ran incorrect benchmark numbers for the Cooler Master Aquagate Max. The correct chart can be found at http://tinyurl.com/56nt38.

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brilliance on the show (the Adama Maneuver still gives me chills), but between the juvenile love triangles (do I really care that Apollo's sleeping with Dee, even though he still loves Starbuck?) and the unrelenting focus on Starbuck (is she dead? Isn't she dead? Who cares!), the parallels with *Melrose* are downright obvious. I'm a big fan of taut political thrillers, but *BSG* has strayed too far from the tried-and-true space-opera formula. Answer me this one question: How many Cylon Raiders were blown up in dogfights after the fleet left New Caprica? I rest my case.

I'M CURIOUS TO KNOW THE THOUGHT PROCESS THAT DEFENDS SUCH A WILD-ASS STATEMENT.

Two Rights Don't Make a Wrong

OK, you've been doing this for a long time and I'm finally tired of waiting for you to notice it on your own: Fair Use does not let you copy things for personal use (i.e. backing up music to a computer, CD-R, or MP3 player). Fair Use lets you use copyrighted material in a review or parody. It's what allows "Weird Al" Yankovic to do song parodies or *Maxim* to show stills and quotes from movies. What you're talking about is the Audio Home Recording Act of 1992. Don't get me wrong: I completely agree with you that DRM has gone too far and that we shouldn't have to fight encryption schemes to copy a DVD to an iPod. But using the wrong terminology won't help.

—Dustin Stevens

Deputy Editor Katherine Stevenson Responds: You are absolutely right, Dustin, and we stand corrected, even if the spirit of our remarks regarding consumers' rights is unchanged.

GPU vs. CPU: Fight!

I was very disappointed with your review of the Puget Systems Deluge-i A2 (August 2008). There was no need to jump on the CPU vs. GPU drama in this review of a clearly overpriced system. It is not unheard of in a gaming system to shell out more for the GPU than for the CPU. The GPU:CPU cost ratio in the Puget is 1.9:1 ($380/$200). Your own Dream Machine 2007 was 1.75:1 ($1,750/$1,000)—and the GPU price was limited only by being kept to two 8800 Ultras in the 680i motherboard. The Overdrive PC Core2.SLI you reviewed in September 2007 and gave a 9 verdict to had two 8800 Ultras and just an E6850 CPU. I'm not sure of the prices then, but that had to have been more than a 2:1 ratio.

I think the Puget review should have focused on the system's lack of value; anyone could have built that computer for about $1,600 when you wrote the article, so what does the other $1,050 buy from Puget?

By the way, the PSU is a Corsair, not a Cooler Master (as listed in the specs box). I can read it in the picture and am familiar with that unit.

—Charles Glasscock

Senior Editor Gordon Mah Ung Responds: I think you missed our point. Our problem was not that one shouldn't spend more on a videocard than the CPU, but one should not exclude CPU performance as an important factor. That's exactly what some GPU companies are pushing and what some consumers actually believe. We don't think a company has to use a $1,000 Core 2 Extreme, but we believe quad-core processing is a must-have feature today and our performance benchmarks prove us right. Regarding the PSU, good catch. It is a Corsair.

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CONIFEROUS

The Vashaun Elite

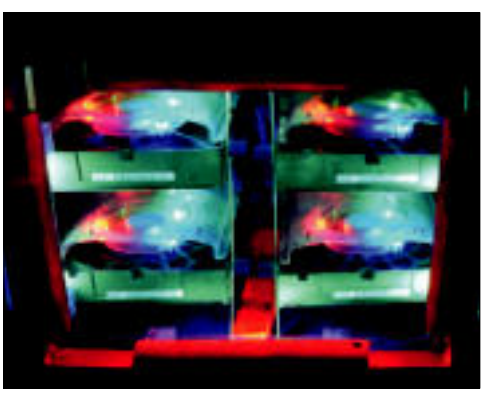
Brian Arnold needed a new case. After studying what was available, he determined there wasn't one that exactly fit his needs. Rather than settle for anything less than what he wanted, he headed out to the garage and started to build the Vashaun Elite.

After six weeks of sketching, measuring, sawing, and sanding, Brian completed this build. His advice for anyone considering working with wood: Before you apply stain, go over every inch of your case with a magnifying glass to look for imperfections. Once the stain is applied, any tiny nicks you missed will become extremely noticeable.

BE A WINNER!

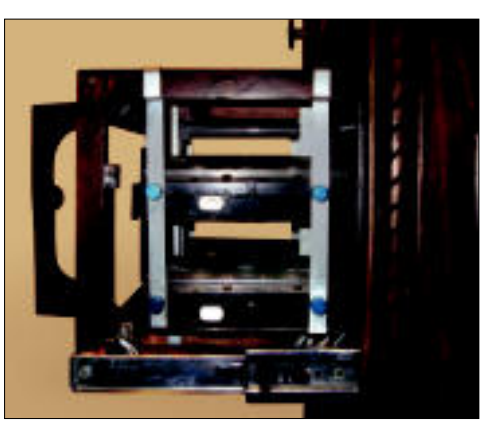
For submitting this month's winning entry, Brian has won a $250 gift certificate. To enter the Rig of the Month contest, see the official rules on page 101.

If you build it, you get to stick your name on it. There's no question that Brian Vincent Arnold is responsible for this rig!



The sound-activated ultraviolet lighting system pulses and changes color to the beat of the music playing on the system. If this were our rig, "Superfreak" would be playing nonstop!

The front panel's bays hold a DVD burner, fan-speed controller, card reader, floppy drive, power and reset buttons—and a cigarette lighter.



The four hard drives slide out for easy access. Keeping them away from other components also makes it easier to cool the rig.

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